



United
States
Department
of
Agriculture

Forest
Service

December
2014



Environmental Assessment

Little Deer Project

**Goosenest Ranger District, Klamath National Forest
Siskiyou County, California**

Township 44 North, Range 2 West, Sections 3-10, 16-19;
Township 45 North, Range 2 West, Sections 32 and 33; and
Township 44 North, Range 3 West, Sections 1, 12, 13, and 24, Mt. Diablo
Meridian.

For Information Contact: Jamie Kolesar
Goosenest Ranger District
37805 Highway 97
Macdoel, CA 96098
530-398-5795

<http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=45313>

Non-Discrimination Policy

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the bases of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, or all or part of an individual's income is derived from any public assistance program, or protected genetic information in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases will apply to all programs and/or employment activities.)

To File an Employment Complaint

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (PDF) within 45 days of the date of the alleged discriminatory act, event, or in the case of a personnel action. Additional information can be found online at www.ascr.usda.gov/complaint_filing_file.html.

To File a Program Complaint

If you wish to file a Civil Rights program complaint of discrimination, complete the [USDA Program Discrimination Complaint Form](#) (PDF), found online at www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442 or email at program.intake@usda.gov.

Persons with Disabilities

Individuals who are deaf, hard of hearing or have speech disabilities and you wish to file either an EEO or program complaint please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

Persons with disabilities who wish to file a program complaint, please see information above on how to contact us by mail directly or by email. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.) please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Table of Contents

Summary	1
Chapter 1 Purpose of and Need for Action.....	3
Document Structure	3
Background	4
Forest Plan Direction	4
Purpose and Need for Action	5
Purpose and Need	5
Existing and Desired Condition.....	5
Proposed Action.....	6
Decision Framework	7
Public Involvement	7
Issues.....	8
Chapter 2 Proposed Action and Alternatives	10
Alternatives	10
Alternative 1	10
Alternative 2	10
Alternative 3	13
Alternatives Considered but Eliminated from Detailed Study.....	13
Alternative A: Planting Only	13
Project Design Features	14
Comparison of Alternatives	17
Chapter 3 Environmental Impacts of the Proposed Action and Alternatives	23
Vegetation	24
Methodology	24
Affected Environment	24
Environmental Consequences	25
Compliance with Law, Policy, Regulation, and the Forest Plan	29
Fire and Fuels.....	29
Methodology	29
Affected Environment	31
Environmental Consequences	31
Compliance with law, regulation, policy, and the Forest Plan	35
Wildlife	35
Methodology	35
Affected Environment	36
Environmental Consequences	37
Compliance with law, regulation, policy, and the Forest Plan	40
Botany	40
Methodology	40
Affected Environment	41
Environmental Consequences	42
Compliance with law, regulation, policy, and the Forest Plan	43
Range	44
Methodology	44
Affected Environment	44
Environmental Consequences	45
Compliance with law, regulation, policy, and the Forest Plan	46
Soils.....	46
Methodology and Analysis Indicators.....	46

Affected Environment.....	47
Environmental Consequences.....	48
Compliance with law, regulation, policy, and the Forest Plan.....	50
Water Quality	51
Methodology.....	51
Affected Environment.....	52
Environmental Consequences.....	54
Compliance with law, regulation, policy, and the Forest Plan.....	58
Air Quality.....	58
Methodology.....	58
Affected Environment.....	59
Environmental Consequences.....	59
Compliance with law, regulation, policy, and the Forest Plan.....	60
Social and Economic	60
Methodology.....	60
Affected Environment.....	61
Environmental Consequences.....	62
Compliance with law, regulation, policy, and the Forest Plan.....	66
Scenery	66
Methodology.....	66
Affected Environment.....	68
Environmental Consequences.....	68
Compliance with law, regulation, policy, and the Forest Plan.....	71
Recreation.....	71
Methodology.....	71
Affected Environment.....	72
Environmental Consequences.....	72
Compliance with law, regulation, policy, and the Forest Plan.....	73
Cultural	74
Analysis Indicators and Methodology	74
Affected Environment.....	74
Environmental Consequences.....	75
Compliance with law, regulation, policy, and the Forest Plan.....	76
Chapter 4 Consultation and Coordination.....	78
Preparers and Contributors	78
Federal and State Agencies and Tribes.....	78
Literature Cited	79
Appendix A: Treatment Prescriptions by Alternative	84
Appendix B: Vicinity and Alternative Treatment Maps.....	89
Appendix C: Actions Considered for Cumulative Effects.....	99
Ongoing and Future Foreseeable Actions.....	99
Ongoing and Future Foreseeable Actions (Private).....	101
Appendix D: Disposition of Scoping Comments	103
Method of Scoping Comments Analysis	103
Results of Scoping Comment Analysis.....	103
Appendix E: Best Management Practices.....	133
References.....	136
Appendix F: Aquatic Conservation Strategy	137
Current Conditions and Range of Variability	137

List of Tables

Table 1- 1: Management areas found within the Little Deer Project boundary	4
Table 1- 2: Existing and Desired Condition used to develop the project proposal.	5
Table 1- 3: Relevant issues identified and resulted in alternatives analyzed in detail.....	9
 Table 2- 1: Little Deer project design features and applicable stands	14
Table 2- 2: Comparison of treatment by alternatives	17
Table 2- 3: Comparison of effects of alternatives by resource	17
Table 2- 4: Summary of alternative effects related to the purpose and need of the project	21
Table 2- 5: Comparison of Alternative Indicators by Relevant Issues	22
 Table 3- 1: Results of vegetation measures used for alternative 1	26
Table 3- 2: Results of measures used for alternative 2	27
Table 3- 3: Results of measures used for alternative 3	28
Table 3- 4: Comparison of vegetation measures by alternative	28
Table 3- 5: Fuel load, predicted flame length, and predicted severity by fuel model	30
Table 3- 6: Flame-lengths, fuel loads, and fire severity for alternative 1	32
Table 3- 7: Flame lengths, fuel loads, and fire severity for alternative 2	33
Table 3- 8: Flame lengths, fuel loads, and fire severity for alternative 3	33
Table 3- 9: Comparison of short term effects of alternatives on fire and fuel.....	34
Table 3- 10: Comparison of effects of alternatives on fire and fuel after 20 years	34
Table 3- 11: Comparison of effects of alternatives on fire and fuels after 40 years.....	35
Table 3- 12: Forest Service sensitive species in or adjacent to the project area.....	36
Table 3- 13: Species status, effects, and determination for all alternatives.....	39
Table 3- 14: Comparison of short-term effects to snag-associated MIS species.....	39
Table 3- 15: Percentage of forage utilization at end of grazing season within the project area	44
Table 3- 16: Comparison of alternatives based on acres of treatments that may affect range	46
Table 3- 17: Comparison of effects of alternatives on soil indicators	50
Table 3- 18: Comparison of social and economic effects of alternatives	66
Table 3- 19: Identified potential viewsheds, sensitivity level, and distance zone	67
 Table 4- 1: Preparer or contributor by position or role.....	78
 Table A- 1: Treatments by project stand number.	84
 Table C- 1: Planned activities by project and fiscal year planned.....	100
 Table D- 1: Respondent Correspondence and any attachments received.....	103
Table D- 2: Content analysis categories and comments received in each category	104
Table D- 3: Comments from scoping and disposition of comments	105
Table D- 4: Field trip dates and respondents attended	128
Table D- 5: Disposition of field trip issues raised	128

List of Figures

Figure B- 1: Vicinity map of Little Deer Project area.	89
Figure B- 2: Watershed map showing the 6 th and 7 th field watershed boundaries.....	91
Figure B- 3: Forest Plan forest-wide management area map	93
Figure B- 4: Map of alternative 2	95
Figure B- 5: Map of alternative 3	97

Summary

The Klamath National Forest (Forest) is proposing the Little Deer project on the Goosenest Ranger District in response to the Little Deer fire of 2014 that burned at high or moderate severity in a 5,503-acre area west of highway 97 about 12 miles southwest of Macdoel in Siskiyou County, California. There are up to 3,425 acres of treatment proposed on the 4,842 acres of National Forest System lands. Treatments include harvesting and removing dead or dying trees; removing trees that are likely to fall on roads to improve safety for travelers; reducing fuel loading and improving safety in the woods for the public, forest workers and firefighters; and planting conifers, brush that is suitable for browse, and native grasses to accelerate regrowth of vegetation. The environmental assessment (EA) considers the environmental consequences of the “no action” alternative (alternative 1) as well as two action alternatives. Alternative 2 is based on the initially-developed proposed action and alternative 3 was developed in response to relevant issues raised during scoping. The purpose of the project is to (1) reduce safety hazards, limit fuel continuity, and reduce fuel loads to minimize unacceptable future fire risk, while also promoting the successful protection of the public, forest workers, and other resources within the project area; (2) provide forest products, including firewood, while the wood is still marketable; (3) obtain the maximum economic value from burned timber by offering a sale while the wood is still marketable; (4) restore the project area to a healthy forested landscape with a diversity of habitat conditions that reflect historical vegetation conditions and the ecological capability of the landscape, including natural openings and native browse species components within a conifer-dominated landscape; and (5) restore scenery conditions within the project area to a conifer-dominant scenic character that is consistent with historic scenery conditions, while minimizing short-term scenery.

Public scoping began September 22, 2014. This scoping involved and informed tribes, adjacent landowners, permittees, agencies and other interested parties. As a result, two relevant issues were identified. The 30-day public comment period for the EA begins with publication of the legal notice in the Siskiyou Daily News (expected on or around December 8, 2014) and ends 30 days following publication. Based on this EA, public comments on the EA, and supporting documents within the project record, the decision to be made by the responsible official (Forest Supervisor) is whether to implement the modified proposed action, an alternative to the proposed action, or to take no action. This EA also aids the responsible official in determining whether the effects disclosed will have a significant effect on the human environment.

This project is subject to comment pursuant to 36 CFR 218, Subparts A and B. Comments received will be considered during the preparation of the final EA if they are submitted within the deadline, are specific to the scope of the proposed action, have a direct relationship to the modified proposed action and alternatives, and include supporting rationale. Specifics on how to submit comment are included in the letter accompanying this EA.

Lead Agency:**USDA Forest Service****Responsible Official:****Patricia A Grantham**
Forest Supervisor, Klamath National Forest
1711 South Main Street
Yreka, CA 96097-9549**For Information Contact:****Jamie Kolesar, Goosenest Ranger District**
37805 Highway 97, Macdoel, CA 98098
jkolesar@fs.fed.us, 530-398-5795

[This page intentionally left blank]

Chapter 1 Purpose of and Need for Action

We prepared this environmental assessment (EA) to determine if proposed project activities may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement. By preparing this EA, the Klamath National Forest (Forest) is fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA). For more details of the proposed action, see the Development and Comparison of Alternatives section of Chapter 2 of this document.

Document Structure

The USDA Forest Service (Forest Service) has prepared this EA in compliance with NEPA and other relevant federal and state laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that will result from the proposed action and alternatives. The document is organized into four parts:

1. *Purpose of and Need for Action (Chapter 1)*: This section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for meeting that purpose and need. This section also details how the Forest informed the public of the proposal and how the public responded.
2. *Development and Comparison of Alternatives (Chapter 2)*: This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on relevant issues raised by the public and other agencies. This discussion also includes project design features that are applicable to all alternatives. Finally, this section provides a summary of alternatives and the environmental consequences associated with each alternative.
3. *Affected Environment and Environmental Consequences (Chapter 3)*: This section describes the current condition of the project area and the environmental effects of implementing the proposed action and alternatives. This analysis is organized by resource area. Within each resource section, the affected environment is described first, followed by the effects of the no action alternative that provides a baseline for evaluation and comparison of the alternatives that follow.
4. *Consultation and Coordination (Chapter 4)*: This section provides a list of preparers and agencies consulted during the development of the EA.
5. *Appendices*: The appendices provide more detailed information to support the analyses presented in the body of the EA.

The EA and supporting documents including maps and resource reports are available on the project website at: <http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=45313>. Paper copies of documents are available for public review at the Goosenest Ranger District Office in Macdoel, California.

Background

The Little Deer Project was developed in response to landscape-level ecosystem restoration needs following the 2014 Little Deer Fire on the Goosenest Ranger District (District) of the Klamath National Forest (Forest). The Little Deer Fire began on July 31, 2014 and was contained on August 11, 2014, burning about 5,503 acres.

The project boundary follows the fire perimeter, excluding sections of private land on the southwestern and northeastern sections of the fire. Of the possible 4,842 acres of National Forest System land within the project boundary, the project will treat up to 3,425 acres. Treatment is excluded from private property located within the project area (see appendix B for project maps).

The project is located eight miles west of Bray and about 12 miles southwest of Macdoel, California, in Siskiyou County (appendix B; figure 1) in Township 44 North, Range 2 West, Sections 3-10, 16-19; Township 45 North, Range 2 West, Sections 32 and 33; Township 44 North, Range 3 West, Sections 1, 12, 13, and 24, Mt. Diablo Meridian. The project is located within the 5th field Butte Creek and Whitney-Sheep Rock watersheds, the 6th field Horsethief Creek and Grass Lake watersheds, and the 7th field Grass Lake South, Grass Lake Northeast, Upper First Creek, Lower First Creek, Penoyar, and Horsethief Creek watersheds (see appendix B; figure 2). Highway 97 runs adjacent to this project and travels through a small piece inside the project area.

Forest Plan Direction

Initial direction for this project comes from the Forest Land and Resource Management Plan (Forest Plan) of 1995, as amended. Other laws, plans and policies that provide management guidance or direction for this project include, but are not limited to, the National Fire Plan, the Forest Fire Management Plan, the Endangered Species Act, the National Historic Preservation Act, the Clean Water Act, and the Clean Air Act. The project is designed to be consistent with all applicable laws, policies and plans.

Key direction for this project comes from the Forest Plan forest-wide standards and guidelines (standards) and those specific to Management Areas (MA) that are found within the project area, as described in Table 1 below and Figure 3 (appendix B). For further information pertaining to the Forest Plan, please visit the Forest website.

Table 1- 1: Management areas found within the Little Deer Project boundary

Management Area	Pages in Forest Plan	Acres
Riparian Reserves (MA-10)	4-106 to 4-114	104
Retention Visual Quality Objectives (MA-11)	4-115 to 4-116	1112
Partial Retention Visual Quality Objectives (MA-15)	4-126 to 4-127	1982
Forage (MA-16)	4-128 to 4-130	3422
General Forest (MA-17)	4-131 to 4-132	708

In addition to management areas discussed in the Forest Plan, the project area is within the Goosenest Adaptive Management Area. Standards for this area are located on pages 4-133 to 4-137 of the Forest Plan.

Purpose and Need for Action

Purpose and Need

There is a need to move from the existing condition toward the desired condition, while protecting forest resources. The purpose and need statements for this project and the needs they will address are listed below:

1. Reduce safety hazards, limit fuel continuity, and reduce fuel loads to minimize unacceptable future fire risk, while also promoting the successful protection of the public, forest workers, and other resources within the project area.

- There is a need to have fuels conditions that allow for safe direct attack during a wildfire
- There is a need to remove trees killed or severely burned by wildfire to provide safe access to and through the area.

2. Provide forest products, including firewood, while the wood is still marketable.

3. Obtain the maximum economic value from burned timber by offering a sale while the wood is still marketable.

- There is a need to offer a sale while the wood is still marketable because dead forest products lose significant value if left standing beyond two winters

4. Restore the project area to a healthy forested landscape with a diversity of habitat conditions that reflect historical vegetation conditions and the ecological capability of the landscape, including natural openings and native browse species components within a conifer-dominated landscape.

- There is a need to maintain healthy, vigorous conifer forest on the landscape.
- There is a need to focus on restoration of the ponderosa pine forest type in order to close the gap between the existing and desired condition, while protecting forest resources.

5. Restore scenery conditions within the project area to a conifer-dominant scenic character that is consistent with historic scenery conditions, while minimizing short-term scenery.

- Addressing the need to restore the scenic character of the project area.

Existing and Desired Condition

Table 1-2 below provides a summary of the existing and desired conditions considered during the development of the purpose and need and proposed action.

Table 1- 2: Existing and Desired Condition used to develop the project proposal.

Purpose and Need Statements	Existing Condition	Desired Condition
1. Limit fuel continuity and reduce fuel loads to minimize unacceptable future fire risk, promoting the successful protection of the public, forest workers, and other valued resources within the project area.	Roadways within the project area surrounded by fire killed and damaged trees and preexisting danger trees pose a hazard to the public and Forest workers. Without treatment hazards will continue to increase and may impede access.	Access to public land along roadways and trailheads are unimpeded. Mitigate hazards from falling danger trees to the greatest extent possible to establish a trajectory towards a safer road system covered by this project.

Purpose and Need Statements	Existing Condition	Desired Condition
<p>2. Provide forest products, including firewood, while the wood is still marketable.</p> <p>3. Obtain the maximum economic value from burned timber by offering a sale while the wood is still marketable.</p>	<p>The fire burned at high severity through most of the project area. This resulted in mortality of a majority of conifers and shrubs within fire perimeter.</p>	<p>Dead or dying trees are harvested to produce wood products as consistent with Forest goals. (Forest Plan, pp. 4-131-132 and 4-49)</p>
<p>4. Restore the project area to a healthy forested landscape with a diversity of habitat conditions that reflect historical vegetation conditions and the ecological capability of the landscape, including natural openings and native browse species components.</p>	<p>Post-fire vegetation is mostly severely burned coniferous forest interspersed with antelope bitterbrush, manzanita, mountain mahogany, rabbit brush, and various <i>ceonothus</i> species. Additional mortality is expected around the burn perimeter and unburned islands as stressed trees succumb to insects (i.e., western and mountain pine beetle).</p> <p>Areas within the project with tree mortality may be slow to recover due to heavy fuel loading as a result from of fallen snags, lack of seed, rocky soil, and limited rain fall and may impede conifer development.</p> <p>The fire has reduced forage availability in much of the treatment area; early seral vegetation will not be available for approximately ten years.</p>	<p>The long-term desired future condition for the project area is a healthy forested landscape with diverse ecosystem conditions reflective of the historical vegetation conditions and the ecological capability of the landscape. This includes some natural openings, and native browse species and conifers within a conifer-dominated landscape.</p> <p>In the short term, clumps of leave snags would provide post-fire nesting habitat for a variety of species. In the long term, a varied conifer overstory and understory vegetation components would provide forage and cover for deer and elk.</p> <p>A variety of early and mid seral state grass and forb species will be present within the fire area. Weed infestations will remain low and no new weed species will be introduced. Forage availability will be equal to or greater than pre-fire conditions. (Forest Plan, pg. 4-131)</p>
<p>5. Restore scenery conditions within the project area to a conifer-dominant scenic character that is consistent with historic scenery conditions, while minimizing short-term scenery disturbances.</p>	<p>The forest canopy currently displays evidence of an unusually large and intense wildfire. The burn area is prominent from several surrounding public viewpoints, both close-up and distant. The fire killed a high percentage of the vegetation within its 5,503 acres, consuming much of the visible canopy, yet some noticeable scattered dense clumps and smaller patches of green trees currently remain.</p>	<p>Scenery disturbances would be relatively minor as viewed from sensitive public viewpoints. In the short term, views would appear largely natural, including the wildfire evidence from of clumps of standing snags. In the long term, overall scenery attributes would include a conifer-dominated landscape with native shrub, with forb and grass components. (Forest Plan, pp. 4-115 and 4-126)</p>

Proposed Action

The proposed action was designed to meet the purpose and need of the project. During scoping the project proposed treatment on about 3,370 acres within the project area of 4,842 acres. The Little Deer Project, as described in the scoping notice for the project issued in September 2014, includes four overlapping types of treatment: (1) dead tree removal, (2) hazard tree removal, (3) planting (which included conifer reforestation and, browse and graze species planting and/or seeding), and (4) machine and hand felling, hand piling and burning. In addition to the above treatments, the proposed action, as scoped, includes access for treatment along 9.71 miles of National Forest roads and 10.09 miles of temporary roads within the project area. The initial proposed action as scoped is

located on the project website (<http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=45313>).

After scoping, the proposed action was modified as follows to become alternative 2:

- Felling, hand piling and burning was originally scoped as a separate treatment. These treatments are now incorporated within the descriptions of site prep and dead conifer removal. After scoping machine piling and burning is now limited to landings following treatment and in conifer reforestation units where site prep is needed (271 acres).
- Treatment acreages adjusted from 2,993 to 1,821 acres of removal of dead trees and trees with a 70 percent likelihood of dying. The treatment acres were refined based on access and economic feasibility.
- The number of miles of temporary roads on existing roadbeds for proposed access was modified to increase mileage accuracy. Temporary road access miles were decreased to 9.3; and will use 12.1 miles of National Forest system roads.

The following clarifications were made:

- Areas designated for firewood cutting will be flagged allowing firewood cutters to fell standing dead and remove down trees within the flagged areas following project implementation. These areas will not have commercial harvest prior to firewood cutter access (87 acres).
- Planting acres were adjusted from 3,370 acres to 3,425 acres. These acres do not account for overlapping planting treatments. Within these acres three different treatments are proposed; Conifer Reforestation (1,821 acres), Site Preparation (271 acres), and Planting and/or Seeding of Shrubs and Grasses (up to 1,463). Site preparation within Existing Plantations (271 acres) will use a combination of low-ground-pressure machinery and hand felling, machine piling, and burning to reduce fuels hazards prior to planting.

Decision Framework

The Forest Supervisor for the Forest is the responsible official for this project. This EA is not a decision document; it discloses the environmental consequences of implementing the no-action alternative or an action alternative. This EA also aids the responsible official in determining whether the effects disclosed will have a significant effect on the environment. If the responsible official determines there will be no significant effects, a “Finding of No Significant Impact” (FONSI) and a Decision Notice will be issued.

Within the Decision Notice, the responsible official will decide whether to implement the modified proposed action (alternative 2), an alternative to the proposed action (alternative 3), or choose no action (alternative 1) at this time. The final decision will be based on the information in this document and the supporting information contained in the project record, consideration of public comments, how well the selected alternative meets the purpose and need for the project, and whether the selected alternative complies with agency policy, applicable state and federal laws, and Forest Plan direction.

Public Involvement

Public scoping is an integral part of the environmental analysis process. Comments in response to scoping are used to determine the range of actions, alternatives, and impacts

to be considered during analysis and to identify relevant issues related to a proposed action.

The following efforts were made to involve the public in the Little Deer project analysis:

- The project was posted on the Forest website on September 18, 2014 and published in the October 2014 Schedule of Proposed Actions.
- On September 22, 2014 a scoping letter was sent to interested and affected parties, including other public agencies, tribes, adjacent property owners, and interested groups and individuals.
- On September 22, 2014 a legal notice of scoping was published in the Siskiyou Daily News, beginning the formal scoping process that guides the development of the EA.
- The Forest Service lead two field trips to the Little Deer project area. The first field trip was held on September 12, 2014 and included Richard Svilich of the American Forest Resource Council, Tristan Allen of CLT Logging and two Forest representatives. Representatives from Klamath-Siskiyou Wildlands Center including George Sexton and Jordan Beckett joined Laura Allen (Goosenest District Ranger), and two additional Forest representatives for a second field trip held on October 8, 2014.
- The Forest also shared information about the Little Deer Fire at a Burned Area Emergency Response (BAER) public meeting held on Friday, October 17, 2014 in Macdoel at the Goosenest Ranger Station.

No official comments were recorded at the BAER public meetings; however, all other comments received as a result of the field trips and public scoping are summarized in appendix D. The core interdisciplinary team met and reviewed all the scoping responses on October 9, 2014 and developed alternatives based on public comments on October 14, 2014.

As a result of scoping, the Forest Service received nine comments from interested parties, agencies, and individuals. Appendix D displays a complete list of respondents, as well as comments made and Forest Service responses. The project file, available at the Goosenest Ranger District office, includes documentation of the letters, phone calls, and field meetings described in this section.

Issues

Comments, questions, and issues raised by the public were tracked upon receipt to assure all relevant comments were captured. The letters and attachments were logged in and electronically filed in the project record. Individual comments from within each comment document were identified and highlighted. Issues and concerns were placed into a subject category based on topic. Issues are points of discussion, dispute, or debate about the environmental effects of proposed actions. Following public scoping, comments were categorized as (1) relevant issues, (2) other issues, or (3) other concerns.

Relevant issues are defined as those directly or indirectly caused by implementing the proposed action. Other issues are identified as those (1) outside the scope of the proposed action and not related to the decision to be made; (2) already decided by law, regulation, policy or direction (Forest Plan); (3) addressed before scoping through project design; or (4) not supported by scientific (or factual) evidence. The Council on Environmental Quality NEPA regulation requires this delineation in Sec. 1501.7, "...identify and

eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)...”

There were two relevant issues identified for this project. See Table 1-3 below for a synopsis of the relevant issues, and the Forest responses to these issues by alternative development or new project design features, and indicators used to analyze relevant issues.

Table 1- 3: Relevant issues identified and resulted in alternatives analyzed in detail.

Relevant Issue #1:	An alternative was recommended that included the retention of 30 percent of standing fire-killed vegetation on a 40-acre scale, low density conifer replanting, retention of 10 snags greater than 10 inches diameter at breast height per acre, and no treatment in the Riparian Reserves. (comment #2-5 in appendix D) from a field trip with the Klamath-Siskiyou Wildlands Center)
Indicators	<ul style="list-style-type: none"> • Percent of 40 acre grid cells treated • Number of wildlife snags retained • Acres of Riparian Reserve Treated • Acres treated outside of Plantations
Alternative	This Relevant Issue lead to the development of alternative 3, which excludes treatment in Riparian Reserves, decreases the amount of dead tree removal by using the 40-acre grid to identify areas for snag retention, and limits planting to dead tree removal stands.
Relevant Issue #2:	The commenter requested that an alternative be developed based on an article by Robert Beschta et al. in 2004 titled “Post-fire Management on Forested Public Lands of the Western United States” (Conservation Biology). (comment #6-48 in appendix D)
Alternative	This Relevant Issue led to the development of alternative A which is an alternative considered but not analyzed in detail.

Chapter 2 Proposed Action and Alternatives

This chapter describes the action alternatives developed to meet the purpose and need, as described in chapter 1. It also describes the no action alternative (alternative 1) and alternatives not considered in detail. Table 2-1 displays the project design features developed to minimize negative environmental effects of action alternatives. Best management practices that will be implemented for action alternatives are displayed in appendix E. Maps of alternatives considered in detail are displayed in appendix B.

Alternatives

Alternative 1

There will be no treatment with this alternative. Alternative 1 (taking no action) provides reviewers a baseline to compare the magnitude of environmental effects of the action alternatives.

Alternative 2

The proposed action as modified is now alternative 2. Alternative 2 proposes to plant conifers, shrubs and native grasses on up to 3,425 acres; 1,821 acres are proposed for the removal of dead trees and trees with a 70 percent likelihood of dying. The alternative is comprised of three overlapping treatment types; (1) dead tree removal, (2) hazard tree removal, and (3) planting. To implement these treatments, access is required along 12.1 miles of National Forest roads and 9.3 miles of temporary roads within the project area. Figure 2 in appendix B shows the treatment areas for alternative 2.

Dead Tree Removal (1,821 acres)

Standing dead trees four inches in diameter at breast height or greater will be removed from the project area. The Forest Service will develop marking guidelines for dead tree removal units based upon Report #RO-11-01 “Marking Guidelines for Fire-Injured Trees in California” (Smith and Cluck, May 2011) which used peer-reviewed science for tree species in Northern California. The guidelines provide for a sliding scale of the probability for tree mortality based on percent of volume or length of crown scorched by fire. Trees with a 70 percent probability of mortality will be cut and removed, meaning that the Forest Service will harvest trees with a 70 percent or greater chance of dying. Trees will be removed and harvested by whole-tree yarding and ground-based tractor logging systems.

Project design features Wildlife-1 and Wildlife-2 in table 2-1 identify the number of snags to be left standing in order to meet Forest-wide standard 8-22 (Forest Plan, page 4-30). Snags left in each unit will vary based on unit size, shape, and land allocation (Forest Plan standard 8-23, page 4-30). Retained snags will be left in groups to provide structure and cover for wildlife, as well as allow for protection during post-harvest fuels treatments (Forest Plan standard 8-24, page 4-30).

Firewood (87 acres)

In addition to the current Forest firewood cutting permit, people cutting personal firewood will be allowed motor vehicle access on an additional 87 acres within stands 719-64, 719-96, and 719-95. These designated stands will not be commercially harvested prior to woodcutter access and will be available for firewood following the proposed logging of surrounding dead tree removal stands. Snags that are to be retained for wildlife habitat will be marked as not available to woodcutters. A temporary road on an existing roadbed will access this firewood cutting area. This temporary road will remain open two years after logging of adjacent dead tree removal units. Cross-country travel will be allowed within the designated firewood stands for removal of standing dead or dead-and- down fire-killed trees. After two years the area will be closed to cross-country travel and the temporary road on the existing roadbed will be blocked.

Hazard Tree Removal (200 acres)

Throughout treatment units, near landings and along system roads, hazard trees will be felled to ensure the safety of forest workers and the public. Trees within these areas will only be removed if they are identified as a hazard. Hazard trees will be identified using the Regional Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region (Angwin et al. 2012). Because of safety concerns associated with hazard trees, trees with up to 60 percent probability of mortality will be cut, meaning that the Forest Service will remove trees with a 60 percent or greater chance of dying. Roadside hazard trees felled within dead tree removal units will be removed from the site. Any hazard trees felled outside of hazard tree removal or dead tree removal units will also be removed unless they are needed to meet the Forest-wide standard for coarse woody debris requirements (Forest Plan standard 6-16, page 4-23 and 4-24). Trees will be removed and harvested by whole-tree yarding and ground-based tractor logging systems.

Planting (up to 3,425 acres)**Conifer Reforestation (1,962 acres)**

Trees will be planted by hand, using either bare root or container stock in dead tree removal stands and in site preparation units. Excessively rocky areas, areas with live trees or natural openings, or areas where trees were not present prior to the Little Deer Fire will be avoided during planting. Conifer reforestation will also include tree planting in the Riparian Reserve along First Creek. Ponderosa pine will be the tree species used for planting; this corresponds with the historical stand composition. An average of 100-300 trees per acre will be planted, resulting in a mosaic distribution. The objective of this treatment is to reestablish ponderosa pine to levels that will meet stand capability and desired future conditions. Planting techniques used to increase survival of planted trees may include but are not limited to: protective tubing for browse prevention; shade blocks for improved microsite conditions; and hand grubbing or low-ground-pressure machinery (to release for survival). In addition, some native browse species and native grass seed will be interspersed to provide future understory vegetation and browsing opportunities. Seeding of native grasses will be limited to up to 15 percent, and planting of shrubs will be limited to up to 10 percent, of the conifer reforestation acres. Grass and shrub species considered for planting are identified in the description of planting of shrubs and/or seeding of grasses below.

Site Preparation and Planting Conifers (271 acres)

The need for site-preparation for conifer reforestation will be evaluated within existing plantations burned during the Little Deer Fire. The site's location on slope, proximity to natural and man-made fire breaks, fuel loading, existing soil cover, and replanting needs will be used to evaluate site-preparation needs. Site-preparation treatments considered for this project include felling and piling using low-ground-pressure machinery or by hand, and pile burning. To help ensure seedling survival, removal of competing vegetation around planted trees by hand grubbing vegetation will be completed as needed five to 10 years after planting.

Shrub Planting and/or Seeding of Native Grasses (up to 1,463 acres)

Shrub planting and/or seeding native grass species will offer both forage and cover to wildlife species. Small groupings of various species such as mountain mahogany and antelope bitterbrush will serve as seed sources for natural recovery without allowing fuel continuity. Planting of bitterbrush will be focused in openings and rocky areas. Mountain mahogany will be planted along the perimeter of rocky areas where they occurred naturally before the fire. These shrub species will be planted on up to 20 percent of the total acres within this treatment area.

In addition to planting shrubs, seeding of perennial native grasses (Idaho fescue and Sandberg Bluegrass) will be intermixed to help facilitate the natural successional process. Seeding native grasses in large unobstructed openings with deep soil profiles will assist in successful growth opportunities for native grasses as well as slow the establishment of invasive weed species. The seeding of these grass species will also help to maintain a natural fire regime. Grass planting will take place on up to 15 percent of the treatment acres.

Each planting or seeding will take place in areas where shrub or grass species historically occupied the stand. These site-specific areas will be determined prior to planting and are not displayed on the map of alternative 2. In order to allow for vegetative recovery of the burned area, grazing pressure will be minimized during seedling establishment by using adaptive management practices outlined in the allotment management plan.

Infrastructure and Access

Landings will be about a quarter of an acre to one acre in size, using existing landings where possible. New landings will be located in relatively flat areas (less than five percent slope) and in natural openings. After treatment, the Forest will evaluate the need for fuel treatment in project landings; fuel treatments will include pile burning within identified landings.

To reduce log skidding distances and associated impacts to soils and other resources, temporary roads will be used about on 9.3 miles of existing roadbeds. All roads needed to access treatments will be cleared and graded as necessary to allow log truck and equipment access using minimum disturbance methods and minimum clearing widths. All 12.1 miles of National Forest system roads used for this project will receive standard road maintenance. Temporary roads on existing road beds re-constructed for this project will be graded, out-sloped, covered with slash (if needed), and blocked with natural barriers after the harvest season (prior to the first winter after use). Once the project is completed, the temporary roads on existing roadbeds will be closed according to recommendations made in the project design feature Road-1 in table 2-1.

Alternative 3

This alternative was developed in response to relevant issue #1. Treatments in alternative 3 include 1) dead tree removal, 2) hazard tree removal, and 3) conifer reforestation. These proposed treatments are identical to alternative 2 with the exception of the differences described below.

Dead Tree Removal (1,598 acres)

This alternative focuses on treatment at a 40-acre scale across the project area. Dead tree removal stands were sectioned into 40-acre blocks with the grid starting at the center of the project area using GIS (see map 3 of appendix B). Within each stand, the overlapping grid calculated how many acres were needed to retain 30 percent of standing dead trees on a 40-acre scale. Standing dead trees four inches in diameter at breast height or greater will be removed on no more than 70 percent of each 40-acre block. On the other thirty percent or more of these 40-acre blocks, snags greater than 10 inches in diameter at breast height will be retained. Retained snags will be left in groups or clusters to provide structure and cover for wildlife (Forest Plan standard 8-24, page 4-30) as in alternative 2. There will be no treatment in, and no ground-based equipment will enter, Riparian Reserves.

Conifer Reforestation (1,598 acres)

In this alternative, conifer reforestation with shrub planting and/or native grass seeding is limited to dead tree removal units and the Riparian Reserve along First Creek. Site preparation and planting are not proposed outside dead tree removal units.

Infrastructure and Access

About 12.1 miles of National Forest system roads (as in alternative 2) and about 9.0 miles of temporary roads within the project area are required for this alternative.

Alternatives Considered but Eliminated from Detailed Study

Alternative A: Planting Only

This alternative was developed in response to relevant issue #2, identified through scoping of the proposed action. A comment requested that the Forest develop an alternative based on the findings of the Beschta et al. article cited in the scoping letter. The findings of this article recommended natural recovery with native vegetation with no ground-based disturbance. It also suggested planting of native species “may be needed where seed sources of native species have been lost by fire” (Beschta et al. 1995). This alternative proposed to plant/seed both conifers and native species of shrub and grasses to establish seed sources for adjacent untreated areas. This planting-only alternative proposed no dead or hazard tree removal and only hand planting and seeding in order to avoid ground-based disturbance. This alternative was considered but eliminated from detailed analysis because it does not meet the purpose and need for this project.

Project Design Features

The following project design features were designed to address overall project objectives, to minimize resource impacts, and ensure consistency with the Forest Plan. Although the project design features below have been developed to address site-specific needs related to this project, many of the project design features are typical and well-proven among similar projects. Table 2-1 displays the project design features developed for this project, along with the applicable units. All project design features are applicable to all action alternatives unless otherwise noted.

Table 2- 1: Little Deer project design features and applicable stands

Design Feature	Description	Applicable Stands/Alternatives
AIR-1	A wetting agent will be applied as needed to decrease dust generated from timber hauling on dirt roads.	All timber harvest stands
AIR-2	Prescribed burning will be conducted in accordance with an approved Burn Plan and an approved Smoke Management Plan. These plans will address mitigations and requirements to minimize impacts of smoke. A Smoke Permit will be requested from the Siskiyou County Air Pollution Control District.	All landings where applicable
ARCH-1	Avoidance - all proposed activities, improvements, and disturbances shall not take place in areas known to contain archaeological and historic sites including any defined buffer zones. Examples of such activities include but are not limited to road maintenance, felling, skidding, vegetative plantings, and burning.	All stands where applicable
ARCH-2	All historic and archaeological sites will be clearly delineated prior to implementing any activities that have the potential to affect these sites. This includes, but is not limited to, flagging site boundaries.	All stands where applicable
ARCH-3	If any unrecorded archaeological, historic-era sites or human remains are identified during project implementation, work in the immediate area will stop and the District Archaeologist and/or the Heritage Program Manager will be contacted prior to continuation of work.	All stands where applicable
ARCH-4	If routine road maintenance activities such as blading, brushing or resurfacing through an archaeological or historic site are necessary, these activities will be confined to previously disturbed surfaces such as ditches, culverts, rocked surface roads and other clearly disturbed contexts. Where road surfaces are native, blades will be lifted or non-archaeological materials such as sterile fill will be placed over the archaeological deposit to prevent surface and subsurface impacts. <ul style="list-style-type: none"> Ground-disturbing activities to close and stabilize temporary roads are NOT allowed within the boundaries of archaeological sites. 	All stands where applicable
ARCH-5	Hazard trees within historic and archaeological sites will be hand-felled and removed by equipment confined to National Forest system roads. Hazard trees that cannot be removed by hand or by equipment operating on system roads will be felled and left in place on the site.	All stands where applicable
BOT-1	In the event any Threatened, Endangered, Sensitive, or Survey and Manage species are discovered before or during the various phases of the project, a botanist will be consulted for appropriate protection measures.	All stands where applicable
FUEL-1	All slash piles at landings will be piled using a brush rake. The slash pile will be dirt-free and a fire dozer line will be put in place around the slash pile.	All timber harvest stands
GEO-1	New lava tube or fault caves discovered during unit layout and tree marking will be identified and protected by a 50 to 250 foot mechanical equipment exclusion buffer, as designated by a cave coordinator or wildlife biologist.	To be determined

Design Feature	Description	Applicable Stands/Alternatives
HYDR-1	Riparian Reserves in the project area include intermittent streams and constructed ponds; Riparian Reserve widths are 150 feet from the edge of the water.	All stands where applicable
HYDR-2	Erosion control measures will be maintained for up to 1 year post-installation.	All stands where applicable
HYDR-3	Protected equipment exclusion areas and drafting sites will be on the sale area map. Temporary roads, riparian reserves, and landing locations will be displayed on green cards.	All timber harvest stands
HYDR-4	New landings will not be constructed within Riparian Reserves.	All timber harvest stands
HYDR-5	Rocking of approaches in drafting sites will be used as required. All boards and plastic will be removed after use. Erosion control will be used at all locations where the possibility of water spill or overflow will result in sediment being moved toward the creek.	All stands where applicable
HYDR-6	Spill kits will be on site during equipment fueling and lubrication.	All stands where applicable
HYDR-7	Pumps used for drafting will incorporate a mesh screened intake, openings not to exceed 3/16th inch. Portable pumps will be placed on an oil-absorbing mat. During water drafting, operations, stream flows will not be reduced by more than 10 percent at any time.	All stands where applicable
HYDR-8	In order to maintain potential coarse woody debris in the Riparian Reserves, non-hazard fire-killed trees greater than 20 inches will not be removed from the Riparian Reserve adjacent to First Creek in the dead tree removal units.	All stands where applicable
HYDR-9	Intermittent channels may be crossed at locations designated by the Forest Service when streams are dry and stream banks are unsaturated during skidding. Crossings will be in locations where the banks are gentle and not undercut.	All stands where applicable
NNIS-1	Equipment that may contain noxious weed seeds or plant parts will be cleaned of all dirt and debris prior to entering the project area.	Project area
NNIS-2	Any hay, straw, or mulch used in this contract will be State of California certified weed-free.	Project area
NNIS-3	Any gravel, road mix, or boulders used in the project area will come from a weed free source and/or will be inspected prior to use.	Project area
RNG-1	All structural rangeland improvements, including fencing, will be mapped during implementation and protected from ground vehicle disturbance. If damage occurs, improvements will be repaired in a timely manner.	All stands where applicable
RNG-2	Timing of logging operations will be made known to the Rangeland Management Specialist in order to decrease conflicts between cattle and heavy equipment.	All stands where applicable
RNG-3	If operations halt for an extended period of time, temporary fencing will be placed where holes have been created in current fencing.	All stands where applicable
ROAD-1	All temporary roads used for entry will be closed immediately following implementation. When multiple entries are necessary for project completion, roads used by contractors will be closed in between each entry. Temporary road closure will include all or a combination of the following activities: (1) placing boulders, earth or log mound barriers to prevent vehicle traffic; (2) subsoiling and outsloping the road surface; (3) installing water bars and other drainage structures; and (4) mulching with native materials (logging slash) or certified weed free straw.	All stands where applicable

Design Feature	Description	Applicable Stands/Alternatives
SCEN-1	<p>Highway 97 foreground zone</p> <ul style="list-style-type: none"> Retain 8-12 snags per acre, retaining the largest trees. Trees are to be retained individually as well as in clumps with smaller trees or out to a maximum distance of 300 feet from the edge of highway. Stump heights to be cut 4 inches if possible, 6 inches maximum height as seen from Highway 97 or out to a maximum distance of 300 feet from the edge of the highway. No tree marking paint on trees will be visible after project implementation as seen from Highway 97. No new landings will be visible from Highway 97. Minimize visibility of existing landings from Highway 97 following implementation by chipping top piles as part of the removal of dead trees and burning slash piles within 3 years after dead tree removal. 	All stands within 1/4 mile of Hwy 97
SCEN-2	<p>Forest Road 70</p> <ul style="list-style-type: none"> Landing to be located 100 feet or more from edge of road. Landing access to be located in existing openings or small trees. Maximize retention of all live trees (particularly large diameter) for visual screening of landing and landing access. Landing access to be re-contoured, access blocked with rocks and logs, and replanted with trees, brush, and grasses in an irregular pattern. Native rock to be scattered on surface. Landings visible from the 70 road will have top piles chipped as part of the dead tree removal and slash piles will be burned within 3 years after removing dead trees. 	Stand 719-84
SCEN-3	No skid trails through scenery retention clumps.	All stands where applicable
SOIL-1	Access to skid trails that intersect Forest Roads will be blocked with available material (either large wood or boulders) post-implementation.	All stands where applicable
SOIL-2	Ground-based logging equipment will be restricted to slopes less than 35 percent.	All timber harvest stands
SOIL-3	If available on site, post-treatment soil cover will be 70 percent. If post-harvest soil cover is below 70 percent, slash will be left on site to prevent soil erosion.	All stands where applicable
SOIL-4	Prevent road runoff from draining onto skid trails and or landings.	All stands where applicable
SOIL-5	Retain existing coarse woody debris (CWD) to meet CWD objectives without conflicting with fuels objectives.	All stands where applicable
SOIL-6	Reuse existing skid trails and landings whenever practical. Dedicate no more than 15 percent of a unit to primary skid trails and landings by good yarding layout and administration.	All stands where applicable
SOIL-7	The Klamath wet weather operation standards (WWOS) (USDA Forest Service 2002) will be used for all project activities.	All stands where applicable
SOIL-8	The project is proposed to take place during the normal operating season (NOS) that is defined as May 1 to November 1 and in dry periods outside the NOS with Line Officer approval. Actions will be restricted during periods of wet weather during the NOS.	All stands where applicable
SOIL-9	Tractor skidding will occur on designated skid trails. Tractors may leave skid trails to access isolated logs if ground conditions permit.	All timber harvest stands
SOIL-10	Waterbar skid trails per Sale Administration Handbook guidelines and as needed. Tree tops may be used instead of waterbars on slopes less than 10 percent.	All stands where applicable

Design Feature	Description	Applicable Stands/Alternatives
SOIL-11	Sub-soiling to reduce soil compaction will be used on landings, main skid trails, and temporary roads where it can be effective. As many as 25 treatment acres will be sub-soiled, mostly in units to the east of First Creek; other locations in the project area are too rocky for this treatment to be effective.	All stands where applicable
WL-1	Leave snags will be distributed as groupings throughout the stand, and not retained on an individual per acre basis. Leave groups will be distributed throughout treated stands and consist of the largest snags available, situated with large, live trees where possible. Snags or dying trees that contain cat faces, broken or forked tops, hollows or cavities burned out cavities, or those that are otherwise damaged to the degree that a cavity may form will be favored for retention.	All stands where applicable
WL-2	All pre-existing (existing prior to the wildfire) large snags (greater than 14 inches diameter at breast height) will be retained. If any pre-existing snags must be felled, these pre-existing snags will be left on landscape as downed wood.	All stands where applicable
WL-3	Incense cedar and snags with broken tops are a high priority for retention.	All stands where applicable
WL-4	Noise producing treatments that are above ambient noise levels within 0.25 miles of Sandhill crane habitat (Grass Lake) will have a seasonal restriction of April 1 to August 1.	Stands 718-87 and 718-89

Comparison of Alternatives

Table 2-2 displays a comparison of treatments by alternative.

Table 2- 2: Comparison of treatment by alternatives

Treatments	Alternative 1	Alternative 2 (acres/miles)	Alternative 3 (acres/miles)
Dead Tree Removal	0	1,821 acres	1,598 acres
Firewood Access	0	87 acres	0
Hazard Tree Removal	0	200 acres	200 acres
Planting/Seeding	0	Up to 3,425 acres	1,598 acres
Conifer Reforestation	0	1,962 acres	1,598 acres
Site Preparation	0	271 acres	0
Shrub Planting and/or Native Grass Seeding (outside conifer regeneration units)	0	Up to 512 acres (293 acres of shrubs and 219 acres of native grasses) spread throughout 1,463 acres	0
Shrub Planting and/or Native Grass Seeding (inside conifer regeneration units)	0	Up to 490 acres (196 of shrubs and 294 of native grasses) spread throughout 1,962 acres	Up to 399 acres (160 of shrubs and 239 of native grasses) spread throughout 1,598 acres
Road Access			
National Forest System Roads	0	12.1	12.1
Temporary Forest Roads	0	9.3	9.0

Table 2-3 is a comparison of the effects of alternatives by the resource that is affected.

Table 2- 3: Comparison of effects of alternatives by resource

	Alternative 1	Alternative 2	Alternative 3
Vegetation	In the short term (five years), 360 acres will be stocked with conifers (due to natural regeneration from live conifers), 263 will be stocked with shrub species that are used for browse (live shrubs that existed after the fire), and 0 acres will have native grasses. In the long term (20 years) the vegetation will not be on a path to meet desired conditions from the Forest Plan.	In the short term (five years), 2,322 acres will be stocked with conifers, 753 will be stocked with shrub species that are used for browse, and 513 acres will have native grasses. In the long term (20 years) the vegetation will be on a path to meet desired conditions from the Forest Plan. This alternative meets NFMA requirements by meeting Forest Plan standards.	In the short term (five years), 1,958 acres will be stocked with conifers, 423 will be stocked with shrub species that are used for browse, and 239 acres will have native grasses. In the long term (20 years) the vegetation will be on a path to meet desired conditions from the Forest Plan. This alternative meets NFMA requirements by meeting Forest Plan standards.
Fuels¹	In the short term, flame lengths are expected to be shorter than 8' with low fuel loads of small material (<3" in diameter). As fire-killed trees fall to the ground, fuel loads of larger material (>3" in diameter) will increase so that at the end of 20 years these fuel loads will be 24 tons per acre. At the end of 40 years, flame lengths will be more than 8' and fuel loads of both small and large material will be high.	In the short term, flame lengths are expected to be shorter than 8' with low fuel loads of small material (<3" in diameter). Due to dead tree removal and planting of conifers, shrubs and native grasses within and outside the dead tree removal units, the fuels loads due to the amount of small diameter material will increase after 20 years. Fuel loads of larger material (>3" in diameter) will decrease to 10 tons per acre. At the end of 40 years, flame lengths will be more than 8' and fuel loads of small material will be high while fuel loads of larger material will decrease to 6 tons per acre.	In the short term, flame lengths are expected to be shorter than 8' with low fuel loads of small material (<3" in diameter). Due to dead tree removal and planting of conifers, shrubs and native grasses in the dead tree removal units, the fuel loads due to the amount of small diameter material will increase after 20 years. Fuel loads of larger material (>3" in diameter) will decrease to 11 tons per acre. At the end of 40 years, flame lengths will be more than 8' and fuel loads of small material will be high while fuel loads of larger material will decrease to 6 tons per acre.
Wildlife: Threatened, Endangered and Proposed species; critical habitat	There are no known occurrences and no habitat (therefore no critical habitat) for these species so there are no effects.	Same as alternative 1.	Same as alternative 1.
Wildlife: Forest Service Sensitive Species	For Forest Service Sensitive Wildlife Species, this alternative will not change the post-fire habitat nor have any direct effects on species.	There will be no effect to bald eagle, northern goshawk, western bumble bee or greater sandhill crane. For pallid bat, Townsend's big-eared bat, and fringed myotis, noise from treatments may affect individuals but are not expected to result in a trend toward federal listing. Forest Plan standards are met.	Same as alternative 2.

¹ For this analysis, fire severity is rated as high or low. Low fire severity is the result of low flame lengths (generally less than 8 feet in timber fuel types). This resembles an underburn with ground vegetation burned but large conifers remaining alive. High fire severity is the result of high flame lengths (generally more than 8 feet in timber fuel types). See Fire and Fuels resource report.

	Alternative 1	Alternative 2	Alternative 3
Wildlife: Management Indicator Species	For Forest Plan Wildlife Management Indicator Species, the snag-association is the relevant indicator. No snags will be removed in this alternative and snags will be abundant in the short term (five years) until they decay and fall to the ground.	In the short term (five years) snags will be removed on 2,092 acres of dead tree removal and site preparation. However, a number of snags will be retained, primarily in groups or clumps, to provide wildlife habitat and meet Forest Plan standards. Therefore, the number of acres of snag habitat removed is less than 2,092. In the long term, reforestation of these acres will encourage the development of snags.	In the short term (five years) snags will be removed on 1,598 acres of dead tree removal. Snags will be retained on 30% of 40-acre grids to provide wildlife habitat and meet Forest Plan standards.
Wildlife: Survey and Manage Species	There are no known populations of survey and manage species and no habitat so there are no effects.	Same as alternative 1.	Same as alternative 1.
Wildlife: Migratory Birds	Effects to migratory birds are disclosed under the effects to Forest Service sensitive and Management Indicator species.	See effects to Forest Service sensitive and Management Indicator species.	See effects to Forest Service sensitive and Management Indicator species.
Range	In the short term, the number of cattle (in animal head months) that can graze in the project area will be minimal due to post-fire conditions and absence of native grasses and limited number of forbs. In the long term, natural regeneration is not expected to substantially improve rangeland resources.	Short terms effects are similar to those of alternative 1. In the long term, planting of native grasses and shrubs within and outside dead tree removal units will improve rangeland resources.	Short terms effects are similar to those of alternative 1. In the long term, planting of native grasses and shrubs within dead tree removal units will improve rangeland resources. Since planting will not occur outside dead tree removal units, recovery of rangeland will be slower and less certain than in alternative 2.
Botany: Threatened, Endangered, Sensitive, or Survey and Manage species	There are no Threatened or Endangered species of plants, Forest Service sensitive plants or survey and manage species so there are no effects.	Same as alternative 1.	Same as alternative 1.
Weeds	Although there were no noxious weeds in the project area before the Little Deer fire, since the fire cheat grass has begun to invade. This alternative will not deter or encourage the invasion or spread of weeds.	The potential invasion and spread of weeds will be minimized by the implementation of project design features and by planting of native grasses on 513 acres within and outside dead tree removal units.	The potential invasion and spread of weeds will be minimized by the implementation of project design features and by planting of native grasses on 239 acres within dead tree removal units but no acres outside these units.
Fish	There is no habitat for fish in the project area so there are no effects on fish.	Same as alternative 1.	Same as alternative 1.

	Alternative 1	Alternative 2	Alternative 3
Water	No treatments equates to no direct effects on water. Indirect effects from falling trees within five years equates to some capturing of sediment, slowing of flows and stabilizing banks of the one intermittent (early-spring flowing) stream in the project area.	An estimated 0.03 and 0.44 cubic yards per year of sediment will be delivered to the mouth of the watersheds for the first four years after implementation. Risk ratios will increase less than 0.02 over existing conditions. First Creek Riparian Reserve will benefit from the accelerated recovery of conifer forest compared to alternative 1.	An estimated 0.03 and 0.43 cubic yards per year of sediment will be delivered to the mouth of the watersheds for the first four years after implementation. Risk ratios will increase less than 0.02 over existing conditions. Indirect effects to the Riparian Reserve from trees falling over the next five years will be similar to alternative 1. First Creek Riparian Reserve will benefit from the accelerated recovery of conifer forest compared to alternative 1.
Soils	Direct and indirect effects will be a slow natural recovery of soil cover. Soil organic matter will remain intact unless severe storm events result in the loss of large amounts of topsoil. Soil structure conditions will remain the same in the short term with very slow long-term natural recovery.	Acres that do not meet desired conditions for soil organic matter and soil structure are 367 and 232. Implementation of project design features will minimize the potential for soil erosion and productivity and provide adequate soil cover to 9.3 miles of temporary road of existing roadbeds.	Acres that do not meet desired conditions for soil organic matter and soil structure are 315 and 207. Implementation of project design features will minimize the potential for soil erosion and productivity and provide adequate soil cover to 9 miles of temporary road of existing roadbeds.
Air	No management actions will be taken that emit nitrogen oxides, greenhouse gases, or impact the visibility in the Lava Beds National Park (a Class I wilderness for air quality).	There will be about three tons of nitrogen oxide emitted by the proposed prescribed burning which is less than the de minimus of 100 tons per year. There is a very low likelihood of preventing the progress of the Regional Haze Plan.	There will be less than 0.1 tons of nitrogen oxide emitted by the proposed prescribed burning, less than the de minimus of 100 tons per year. There is less likelihood of preventing the progress of the Regional Haze Plan than alternative 2.
Scenery	Standing dead trees, blackened tree boles and brush, bare soil and dying trees with brown needles will continue to demonstrate negative effects to scenic character. Falling dead trees will mean that the once-forested landscape will be seen as open, shrub-dominated scenery.	Reforestation of 2,088 acres and retention of any green trees and 27 clumps of snags along highway 97 will improve the scenic character.	Retention of 30 percent of standing dead trees in dead tree removal units will add some texture when viewed from sensitive viewing locations but have little effect on overall scenic character.
Cultural Resources	No implementation of management actions will equate to no negative effects on cultural resources.	Implementation of project design features will minimize or eliminate any negative effects to cultural resources.	Same as alternative 2.
Socio-Economics	No implementation of management actions will equate to no revenue or jobs, and no increased safety, to county residents.	This alternative will provide \$1,222,834 in labor income and 33 jobs if implemented in 2015. In addition, 100 cords of firewood and abatement of safety hazards along 12 miles of road will result.	This alternative will provide \$1,100,638 in labor income and 30 jobs if implemented in 2015. In addition, 50 cords of firewood and abatement of safety hazards along 12 miles of road will result.
Recreation	Post-fire recreation use and opportunities will remain unchanged. The existing shrub component on 263 acres will allow continued hunting opportunities	Temporary negative effects on recreation from project activities will occur. Designated firewood areas (87 acres) will increase recreation firewood cutting in the short term. Planting of 490 acres with shrub species that are used for browse, added to the 263 acres currently existing, will improve deer hunting opportunities.	Temporary negative effects on recreation from project activities will occur. Planting of 160 acres with shrub species that are used for browse, added to the 263 acres currently existing, will slightly improve deer hunting opportunities.

Table 2-4 is a comparison by how each alternative addresses the purpose and need of the project.

Table 2- 4: Comparison of alternative effects related to the purpose and need of the project

Meeting Purpose and Need	Measurement Indicator	Alternative 1	Alternative 2	Alternative 3
Reduce safety hazards, limit fuel continuity, and reduce fuel loads to minimize unacceptable future fire risk, while also promoting the successful protection of the public, forest workers, and other resources within the project area	Acres allowing safe performance of firefighter activities	0 acres	2,021 acres	1,798 acres
	Acres of hazard tree removal along roads	0 acres	200 acres	200 acres
	Overall safety for the public, forest workers and firefighters	No safety measures implemented	Safety improved on 1,821 dead tree removal acres and 200 hazard tree removal acres	Safety improved on 1,598 dead tree removal acres and 200 hazard tree removal acres
Provide forest products, including firewood, while the wood is still marketable	Areas (acres) designated for firewood cutting	0 units (0 acres)	3 units (87 acres)	0 units (0 acres)
	Cubic feet of sawlogs harvested in 2015	0 cu. ft.	1,495,142 cu. ft.	1,343,386 cu. ft.
	Cubic feet of biomass harvested in 2015	0 cu. ft.	580,510 cu. ft.	521,588 cu. ft.
	Cubic feet of sawlogs harvested in 2016	0 cu. ft.	0 cu. ft.	0 cu. ft.
	Cubic feet of biomass harvested in 2016	0 cu. ft.	998,784 cu. ft.	897,408 cu. ft.
Obtain the maximum economic value from burned timber by offering a sale while the wood is still marketable	Gross revenue if harvested in 2015	\$0	\$3,366,337	\$3,024,596
	Gross revenue if harvested in 2016	\$0	\$649,220	\$583,310
Restore the project area to a healthy forested landscape with a diversity of habitat conditions that reflect historical vegetation conditions and the ecological capability of the landscape, including natural openings and native browse species components within a conifer-dominated landscape	Acres of restoration of ponderosa pine by planting	0 acres	1,598 acres	1,962 acres
	Acres of restoration of native browse species and native grasses by planting	0 acres	1,002 acres	399 acres
Restore scenery conditions within the project area to a conifer-dominant scenic character that is more consistent with historic scenery conditions, while minimizing short-term scenery disturbances to retain a largely natural appearance	Pre-fire scenic character restored	Natural regeneration on 360 acres that were not severely burned	Over time, restoration to 2,292 treated acres through treatments by implementing project design features	Over time, restoration to 1,798 treated acres through treatments by implementing project design features
	Acres that meet Forest Plan Visual Quality Objectives (scenic integrity)	4,842 acres	4,842 acres	4,842 acres

Table 2-5 is a comparison of how each alternative addresses relevant issues.

Table 2- 5: Comparison of Alternative Indicators by Relevant Issues

Response considerations	Measurement Indicator	Alternative 1	Alternative 2	Alternative 3
An alternative was recommended that included the retention of 30 percent of standing fire-killed vegetation on a 40-acre scale, low density conifer replanting, retention of 10 snags greater than 10 inches diameter at breast height per acre, and no treatment in the Riparian Reserves.	Acres of dead tree removal using 40-acre grids	0 acres	40-acre grids not used	40 acre grids used, 1,598 acres of dead tree removal
	Percentage of snags retained within 40-acre grids	0 % (40-acre grid not used)	40-acre grid not used; snags retained in clumps to meet Forest Plan standards	Snags greater than 10 inches in diameter retained on 685 acres
	Acres of Riparian Reserve treated	0 acres	Acres treated using project design features	0 acres
	Acres treated outside plantations	0 acres	Up to 512 acres planted with shrubs and native grasses outside conifer regeneration acres	0 acres
An alternative was recommended based on an article by Robert Beschta et al. in 2004 titled "Post-fire Management on Forested Public Lands of the Western United States" (an alternative considered but eliminated from detailed study was developed based on the recommendations in the article)	Acres on which natural recovery is proposed	4,842 acres	2,754 acres (4,842 acres minus 1,821 acres of dead tree removal, 200 acres of hazard tree removal, and 271 acres of planting conifers outside the conifer regeneration units)	3,044 acres (4,842 acres minus 1,598 acres of dead tree removal and 200 acres of hazard tree removal)
	Acres of conifer planting with no site preparation	0 acres	0 acres	0 acres
	Acres of planting of native grasses and shrubs	0 acres	512 acres outside conifer regeneration units; 490 acres within conifer regeneration units	0 acres outside conifer regeneration units; 399 acres within conifer regeneration units

Chapter 3 Environmental Impacts of the Proposed Action and Alternatives

This chapter summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in Chapter 2.

Analysis methods are discussed for each resource, followed by a description of the spatial and temporal context used for analysis. The affected environment section describes the existing condition against which environmental effects are evaluated and from which progress toward the desired condition can be measured (represented by the ‘no action’ alternative). The environmental consequences section discusses the potential effects to the resource associated with the implementation alternatives. This forms the scientific and analysis basis for comparison of the alternatives. This section discloses direct, indirect, and cumulative effects on the resource and discusses the potential for significance of these effects. Effects are quantified where possible; qualitative discussions are included where appropriate. The proposed action and action alternatives include the project design features which were developed to minimize negative effects (table 2-1 of chapter 2).

Effects are defined as (1) direct effects caused by an action and occur at the same place and time as the action; (2) indirect effects caused by an action but are later in time, or removed in distance, from the action; and (3) cumulative effects resulting from incremental impact of an action when added to other past, present, and reasonable foreseeable future actions, regardless of what agency or person undertakes such actions. Direct and indirect effects of an action are often discussed together. Cumulative effects are discussed separately. Effects can result from individually minor, but collectively significant, action taking place over a period of time. Past, present, and reasonable foreseeable future actions are assessed along with the effects of the proposed action and alternatives to determine whether significant cumulative effects occur.

This analysis is consistent with the CEQ memorandum incorporated by reference (Connaughton 2005) which states: “...agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.” Past actions are treated similarly in the recently published Forest Service direction for implementing NEPA (Forest Service Handbook (FSH) 1909.15, 15.1) and are consistent with the Forest Service NEPA Regulations.

Analysis areas for determining environmental effects vary by resource, as does the type of burn severity measured. A number of resources, including Vegetation, Wildlife, and Fire and Fuels, use vegetation burn severity while other resources such as Soil and Water use soil burn severity measures and maps. Actions included in the cumulative effects analysis also vary by resource. Cumulative effects in an analysis area may include estimated effects from past, present, and reasonable foreseeable future private or public vegetation treatments, road construction, grazing, and wildfire exclusion. A list of such potential actions is included in appendix C of this document.

Resource reports provide background for the analyses of effects, and are referenced and summarized in this chapter. These reports use resource data housed in the geographic

information system (GIS) and other relevant sources. The reports are available on the Forest website at <http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=45313>.

Vegetation

Methodology

Stand examinations were not available for this project. Pre-cruise plots were taken to determine species composition, tree size, volume, and percent of vegetation mortality. These plots include a fixed and variable plot on a grid within harvest units. Field visits were also completed to verify collected data and begin the process of formulating treatments. Geographic information system layers were used to identify past harvest activities, vegetation types, and stand boundaries.

The Rapid Assessment of Vegetation Condition model (RAVG) was used to estimate vegetation burn severity based on basal area (existing trees) mortality within the project area. The following categories were used to define high, moderate, low and unchanged:

- **High:** 75-100 percent mortality of basal area
- **Moderate:** 50-75 percent mortality of basal area
- **Low:** 25-50 percent mortality of basal area
- **Unchanged:** 0-25 percent mortality of basal area

Analysis Indicators

The indicator used to evaluate the effects of alternatives on vegetation is the number of acres trending toward ecological capability (desired conditions) five and 20 years after treatment. This indicator will be measured by:

1. Number of acres stocked with conifers (commensurate with site capability) evaluated five years after treatment.
2. Number of acres stocked with desirable shrub species and native grass evaluated five years after treatment.
3. Whether or not the project area is on a path to meet desired conditions (as described in chapter 1) 20 years after treatment and, if so, the time frame in which desired conditions will be achieved.

Spatial and Temporal Boundaries

The spatial boundary for effects on vegetation will be limited to stands proposed for treatment because vegetation changes will be measurable in these units. The temporal boundary for short-term effects is immediately after treatment for up to five years. Long-term effects will extend 20 years post-treatment to evaluate whether stands are on a path to meet desired conditions.

Affected Environment

Before the Little Deer fire, vegetation within the project area was generally described as a lower montane forest type. The ponderosa pine series dominated the project area with the ponderosa pine/bitterbrush plant association (Smith 1994) accounting for about 4,000 acres.

Ponderosa pine/incense cedar accounted for about 500 acres around Little Deer Mountain and 150 acres of mixed conifer existed in the same vicinity. In addition, there were several isolated clumps of aspen within the project area.

Stand conditions before the fire were affected by selective harvest of mature ponderosa pine during the railroad logging era from the 1900's to the middle 1940's. Stands were mid-seral in development before the fire with a scattering of larger remnant trees (mostly ponderosa pine) not removed during railroad logging. Stand densities were high, due to lack of frequent low intensity fires, making this area susceptible to disturbance factors such as wildfire, insect and disease (Larson and Churchill 2012, North 2012).

Before the fire, the shrub community was dominated by bitterbrush growing under the exiting canopy of conifers. Mountain mahogany generally occupied the rocky portions of the project area. Manzanita and rabbit brush were most prevalent in openings. Idaho fescue appears to have been the most prevalent native grass, also occupying openings.

After the wildfire, a majority of the overstory and understory vegetation was lost. In areas of low fire severity, patches of trees and understory vegetation survived, accounting for a relatively small percentage of the project area.

Based on the "Rapid Assessment of Vegetation Condition after Wildfire" (RAVG), high and moderate severity fire affected 82 percent of the project area (46 percent was high severity and 36 percent was moderate). As a result, the majority of the overstory and understory vegetation was lost. Many of the low severity areas are on the edges of the fire perimeter with a few patches of live trees in the interior, limiting seed availability. Mountain mahogany originally occupying lava extrusions also experienced high mortality, with a relatively small percentage surviving. Several isolated clumps of aspen remain within the project area.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Alternative 1 does not have direct effects but has indirect consequences. For example, additional tree mortality is anticipated in areas burned with high and moderate severity due to fire damage, drought stress, and subsequent insect attack, notably western and mountain pine beetle (Agwin 2013, Wood 2002, Hood and Smith 2007). This further reduces the limited seed source within the project area. Without harvesting dead and dying trees, and not planting vegetation (including shrubs and native grasses), the establishment of desired (browse species and conifers) vegetation will be impeded (Savage and Mast 2005). As a result, the ecological capability and plant diversity will not be fully realized.

Dead and dying trees will be most susceptible to windthrow over the next five years. During this period, it is estimated that 60 percent of standing dead trees will have fallen (based on observations of Mt. Hebron fire).

In general, without planting, conifer establishment will be delayed for an extended period of time (Bryan and Rynearson 2008). Lack of an available seed source will reduce the number and distribution of natural seedlings. Only 360 acres are anticipated to naturally regenerate within five years. Without the removal of dead and dying trees, future wind throw will inhibit seedling development. In addition, brush species such as ceanothus, mahalamat and

manzanita can establish from existing live roots and seed banks (Hibbs 2011). Establishment of such species makes conifer establishment uncertain, especially given a limited seed source (Zhang et al. 2008). It is anticipated in 20 years that competing brush will have occupied sizeable portions of the project area.

Re-establishment of mountain mahogany will be delayed without planting. Mountain mahogany does not sprout well and regenerates most effectively through seeding (Gucker 2006). With a majority of the mahogany lost in the fire, the available seed source has been dramatically reduced; it will be difficult for mahogany to recolonize on lava flows that provided much of the habitat before the Little Deer fire. Significant regrowth of mountain mahogany is not expected over the next 20 years.

Regeneration of bitter brush is uncertain, at best, with high severity fire (Zlatnik 1999). This important browse species will be dramatically reduced for an extended period of time without planting. Other less desirable shrubs such as manzanita, rabbit brush and ceanothus will become established, further limiting opportunities for bitter brush.

Native grasses will have difficulty re-establishing, since invasive species such as cheat grass are prolific after disturbance such as from wildfire (Young 1995).

Table 3- 1: Results of vegetation measures used for alternative 1

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	360 acres	No
Desirable Shrub Species	263 acres	No
Native grasses	0 acres	No

After 20 years, the project area is not anticipated to be on a path to meet desired future vegetation conditions with this alternative.

Cumulative Effects

The effects of past actions have been included in the description of the affected environment. The impacts of cattle grazing in the Horsethief grazing allotment are considered in cumulative effects analysis because grazing is a continuing action overlapping the analysis area for vegetation. The potential negative effects of continued cattle grazing to vegetation will be minimized by implementation of adaptive management through the allotment management plan and are not likely to have a measurable effect on the vegetation analysis indicators.

Salvage operations and anticipated reforestation on private land (666 acres) are ongoing activities within the project boundary (appendix C) that will increase the number of stocked acres of conifers after five years. However, these actions do not overlap the vegetation treatment acres of this project.

Adding the effects of alternative 1 to those of ongoing and reasonable foreseeable future actions is not likely to have measurable cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

Removing dead and dying trees, and planting conifers in areas where removal is implemented, will reforest 1,821 acres. Site preparation, and vegetative release (grubbing) around planted trees to reduce competition, will improve tree survival and increase growth.

The effectiveness of conifer planting is well documented (Zhang, 2008 and Landram 1996); planting stock consisting of 1-2 year old ponderosa pine seedlings will improve survivability compared to natural regeneration. With a well-developed root system, seedlings are able to draw moisture 8-12 inches below the ground surface. After reforestation, mosaic patterns will result due to the presence of rocky soils (on which planting is not likely to be successful) and seedling mortality (which may be up to 40 percent). If soil conditions are dry during planting, resulting stocking levels are expected to be commensurate with site productivity (FSH 2409.26) and provide desired spatial variability. Inter-planting shrubs and native grasses will provide a seed source and assist in developing a shrub and grass layer underneath planted conifers which will assist in meeting desired future conditions.

Mountain mahogany planting, especially along edges of lava flows and rock formations, will cover an estimated 10 percent of acres designated for shrub/grass planting, recolonize the areas where it historically grew, and provide seed for future establishment.

Bitter brush planting, especially in rocky areas and openings, will cover an estimated 10 percent of acres designated for shrub/grass planting, develop a younger age class of shrubs and provide a seed source to assist in its re-establishment.

Native grass seeding of up to 15 percent of acres designated for shrub/grass planting and seeding and 15 percent of the acres designated for conifer reforestation will improve re-establishment of grasses.

Table 3- 2: Results of measures used for alternative 2

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	2,322 acres	Yes
Desirable Shrub Species	753 acres	Yes
Native grasses	513 acres	Yes

The proposed action helps to meet the ecological restoration goals identified for this project. After a 20 year period, the project area is anticipated to be on a path to meet desired future conditions described in chapter 1.

Cumulative Effects

Adding the effects of alternative 2 to the effect of ongoing and reasonable foreseeable future actions described in alternative 1 will not have any substantial cumulative effects.

Alternative 3

Direct Effects and Indirect Effects

Conifer planting will have similar effects as alternative 2 although 364 fewer acres will be treated. Mountain mahogany and bitterbrush planting will take place only within the “dead tree removal” units and the number of reestablished acres outside these units will be small. Native grass seeding will take place only within the “dead tree removal” and only be re-established within these stands.

Table 3- 3: Results of measures used for alternative 3

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	1,958 acres	Yes
Desirable Shrub Species	423 acres	Yes
Native grasses	239 acres	Yes

After 20 years, vegetation will be on a path to meet desired conditions. However, the time frame will be longer than alternative 2 as fewer acres will be stocked with desirable species.

Cumulative Effects:

Adding the effects of alternative 3 to the effect of ongoing and reasonable foreseeable future actions described in alternative 1 will not have any substantial cumulative effects.

Comparison of Effects

Table 3- 4: Comparison of vegetation measures by alternative

	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)			After 20 years is vegetation on a path to meet desired conditions?		
Vegetation Type	Alt. 1	Alt. 2	Alt. 3	Alt. 1	Alt. 2	Alt. 3
Conifers	360	2,322	1,958	No	Yes	Yes
Desirable Shrub Species	263	753	423	No	Yes	Yes
Native grasses	0	513	239	No	Yes	Yes

Alternative 1 relies on natural regeneration of conifers, desirable shrubs and native grasses. As a result, relatively few acres are anticipated to be stocked after five years. After 20 years, natural processes will not be on a path to meet desired conditions. The time frame will take much longer than other alternatives without planting desirable species.

Alternative 2 reforests more acres than other alternatives and more acres of desirable shrubs/grasses will be planted in targeted areas. After 20 years, vegetation will be on a path to meet desired conditions. The time frame will be shorter than other alternatives, as more acres will be stocked with desirable species.

Alternative 3 reforests more acres than alternative 1 and fewer acres than alternative 2 as displayed in table 3-4. After 20 years, vegetation will be on a path to meet desired conditions.

However, the time frame will be longer than alternative 2 as fewer acres will be stocked with desirable species.

Compliance with Law, Policy, Regulation, and the Forest Plan

All alternatives are in compliance with law, policy, regulation and the standards for the Forest Plan as displayed in the Forest Plan consistency checklist, available on the project website.

Fire and Fuels

Methodology

The Forest Plan requires the analysis of fuel accumulation over time (standard 22-16, page 4-55). Standard 22-22 (Forest Plan, page 4-55) requires that the hazard, risk and consequences of a wildfire be analyzed. The 40 standard fire behavior fuel models are used as the basis for this analysis of indicators measuring the effects of this project on fire and fuels (Scott and Burgan 2005); more information on these fuel models is provided in the fire and fuels resource report on the project website. Fire behavior fuel models are based on the physical and vegetative characteristics of an area (including fuel loads) and predict, among other outputs, the flame lengths of a wildfire under various weather and fuel moisture conditions.

The analyses of long-term effects are based on professional judgment. Acreage dominated by each of the fuel models are identified using GIS layers (LANDFIRE remotely sensed fuel models) as a coarse filter. Field visits to potential treatment areas verified fuel models. To refine fuel models, field visits were used to make final determinations of the fuel model.

Analysis Indicators

The first indicator in this analysis is flame length, as predicted for each standard fire behavior fuel model under the modeled fuel moisture and weather scenario most similar to local 90th percentile weather and fuel moisture conditions. Flame length directly affects fire suppression tactics and capabilities, and is thus an important indicator of the likelihood of successful fire control efforts. Flame length is analyzed using four categories corresponding to the effort and resources required to attack a fire. Flame length is a measure of fire intensity, which in turn affects fire severity (i.e. vegetation mortality). This is described in more detail on tables 1 and 2 of the Fire and Fuels resource report, available on the project website.

The second indicator is fuel loading (in material less than 3 inches in diameter) as determined by the standard fire behavior fuel models (Scott and Burgan 2005). The following identifies the fuel models in the project area:

- NB9 (99) – Bare Ground.
- GR1 (101) - Short, sparse dry climate grass.
- GS2 (122) - Moderate load, dry climate grass-shrub.
- SH1 (141) - Low load dry climate shrub.
- SH2 (142) - Moderate load dry climate shrub.
- SH5 (145) - High load, dry climate shrub.
- TU5 (165) - Very high load, dry climate timber-shrub.
- TL1 (181) - Low load compact conifer litter.
- TL8 (188) - Long-needle litter.

Fuel loading in material less than 3 inches in diameter has a direct effect on fire behavior; this makes it a useful indicator of fuel reduction effectiveness.

Fuel loading of material greater than 3 inches in diameter has a different effect from that of smaller material as this larger material takes longer to ignite and is likely to result in slower burning. These larger fuels (greater than 3 inches in diameter) reduce fire behavior overall, but fuel loading of these materials is a useful measure of fuel reduction effectiveness because of the potential effects to soils and suppression efforts. Fuels greater than 3 inches will burn for longer periods of time, causing additional heat transfer to the soil and increased potential for soil sterilization. Suppression efforts are more difficult because these larger fuels create an obstacle and safety hazard for fire personnel; often removal of these fuels is necessary to construct control lines. Longer burning times require additional effort to secure control lines and increase the potential for spot-fires. High large fuel loads reduce suppression resource effectiveness and the safety of firefighting resources.

For the purpose of this analysis, under normal conditions (natural fire regimes) fuel loading for early and mid-succession vegetation ranges from 1.5 to 10 tons per acre (LANDFIRE 2007, Anderson 1982). Excess fuel loads of material greater than 3 inches in diameter are represented by 10 tons per acre or greater.

Fire severity is the third indicator and is represented by differences in fire severity acreage as determined by professional assessment of flame lengths predicted under the modeled fuel moisture and weather scenario most similar to local 90th percentile conditions using the standard fire behavior fuel models (Scott and Burgan 2005). Fire severity describes the effects of fire on vegetation should a wildfire occur. It is related to vegetation mortality expected during a wildfire. For this analysis, fire severity is rated as high or low. Low fire severity is the result of low flame lengths (generally less than 8 feet in timber fuel types). This resembles an underburn with ground vegetation burned but large conifers remaining alive. High fire severity is the result of high flame lengths (generally more than 8 feet in timber fuel types). High severity fire kills nearly all of the large conifers and may lead to reduced re-sprouting of brush. Table 3-5 displays fuel loads (in material less than 3 inches in diameter), flame lengths and predicted severity for each of the various fuel models.

Table 3- 5: Fuel load (material less than three inches in diameter), predicted flame length, and predicted severity by fuel model

Fuel Model	Total Fuel Load of material <3" in diameter in tons/acre	Flame Length in feet	Predicted Severity
NB9 (99)	0	0	N/A
GR1 (101)	0.4	2.5	Low
GS2 (122)	2.6	8.5	High
SH1 (141)	1.95	0.9	Low
SH2 (142)	8.35	7.0	Low
SH5 (145)	8.6	21.0	High
TU5 (165)	14	11.0	High
TL1 (181)	6.8	0.8	Low
TL8 (188)	8.3	5.8	Low

Spatial and Temporal Context

Spatial boundaries, for direct and indirect effects, will be limited to acres treated because it is on these acres that fuel models are predicted to change. Spatial boundaries for cumulative effects will be limited to the project area because the fuels models in the project area may be affected by current and reasonable foreseeable future actions surrounding the treatment areas. Temporal bounding for effects extends 40 years following treatment because this is required in the Forest Plan (standard 22-16, page 4-55). Effects will be modeled immediately after treatment, 20 years after treatment, and 40 years after treatment. Effects immediately after treatment will be considered short-term effects. Effects at 40 years are considered long-term effects.

Affected Environment

Vegetation in the project area prior to the Little Deer fire is discussed in the Vegetation section; pre-fire fuel models based on this vegetation were altered by past timber harvest and fire suppression causing predicted high severity fire effects throughout the project area. The historical condition of fire and fuels in the project area is described in detail in the Fire and Fuels resource report. Most of the project area historically supported fire return intervals of 13 years resulting in low fuel loads, low flame lengths, and low fire severity. When the Little Deer fire occurred, the area had missed several fire return intervals. With the exclusion of frequent fires, stands attained fuel loads represented by high severity fuel models, providing conditions conducive to wildfires such as the Little Deer fire that exhibited high flame lengths and high severity fire effects.

The post-fire landscape is comprised of bare ground (fuel model NB9), sparse grass (GR1), and low load compact conifer litter (TL1). About 46 percent of the project area burned with high severity effects and 36 percent with moderate severity effects. About 28 tons per acre of dead trees greater than three inches in diameter are estimated to be scattered throughout the project area based on conditions measured after the nearby 2009 Tennant fire.

Environmental Consequences

This section analyzes the effects that each alternative has on the acreage occupied by each fuel model, and the relationship of these acreages to the three analysis indicators (flame lengths, fuel loads, and fire severity).

Alternative 1

Direct Effects and Indirect Effects

Under alternative 1 there will be no project actions taken and, as noted in the Vegetation section, vegetation will continue to be dominated by shrubs and conifer re-establishment will be slow for an extended time period. Potential high severity unplanned fires will promote continued dominance of shrubs until a seed source for conifers can become established. With no treatment, bare ground moves to moderate load grass-shrub (GS2), then to high load shrub (SH5). Sparse grass moves to moderate load shrub (SH2), then to high load shrub. Low load compact conifer litter moves either to low load shrub (SH1) then to high load shrub, or to long needle litter (TL8) then to very high load timber-shrub (TU5) as displayed in tables 4A through 4C of the Fire and Fuels resource report.

Based on mortality and snag fall observed after the 2009 Tennant fire, it is estimated that 60 percent of pine snags in the Little Deer project area will fall to the ground in five years. There will be at least 28 tons per acre of dead material greater than three inches in diameter from fire-killed trees with a total of 116,200 tons in the project area. As snags fall and woody material decomposes, some of the larger diameter material (greater than 3 inches) will be converted to dead fuels which are slow to ignite; this will generally result in low fire severity to vegetation but higher severity to soils. Fuel loads for dead material less than 3 inches in diameter relate directly to fire behavior within the flaming front of the fire. Increases in these fuels generally result in an increase in fire severity, in suppression effort needed to control fires, and in the potential for passive and active crown fires. An increase in potential for crown fires increases the potential for mortality due to crown consumption (Brown and Kapler 2000). Table 3-6 displays the flame lengths, fuel loads and fire severity that are likely in the short term and long term with alternative 1.

Table 3- 6: Flame-lengths, fuel loads, and fire severity currently, after 20 years, and after 40 years for alternative 1

Weighted Averages	Flame Length (Feet)	Fuel Load (Tons Per Acre <3")	Fuel Load (Ton Per Acre >3")	Percentage of High Severity Acres
Current	0.8	6.3	0	0%
After 20 years	2.9	4.0	24	6%
After 40 years	18.0	10.2	18	100%

Cumulative Effects

The effects of past actions have been included in the description of the affected environment. There are some reasonable foreseeable future actions within the project area that will result in reduced potential for high intensity wildfires; these are limited to areas in and around the other vegetation treatments on private lands. For example, salvage harvest and live tree planting is likely to be implemented on private land; the potential for high intensity wildfire is likely to decrease around these private lands if trees outcompete and shade brush, especially if herbicides are used to eliminate brush on these private lands. The impacts of ongoing cattle grazing in the Horsethief grazing allotment are considered in this cumulative effects analysis but grazing is not likely to have a measurable effect on the analysis indicators for fire and fuels and is not likely to contribute to changes in fire severity. There are no reasonable foreseeable future actions that will reduce the probability of fire entering the project area from outside. Adding the effects of alternative 1 to the effects of private land treatments and cattle grazing is not likely to produce substantial cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

Proposed treatments for alternative 2 are described in chapter 2. This alternative will remove an estimated 50,988 tons per acre of dead material greater than 3 inches from fire-killed trees from the total of 116,200 tons in the project area (43 percent removal). After browse species planting, bare ground moves first to moderate load shrub, then to high load shrub. After dead tree removal, reforestation and/or browse species planting, low load compact conifer litter moves either to very high load timber-shrub (resulting in high predicted fire mortality to

planted conifers) or first to long needle litter, then to high load shrub as displayed in tables 5A through 5C of the Fire and Fuels resource report.

Table 3- 7: Flame lengths, fuel loads, and fire severity after treatment, after 20 years, and after 40 years for alternative 2

Weighted Averages	Flame Length (Feet)	Fuel Load (Tons Per Acre <3")	Fuel Load (Ton Per Acre >3")	Percentage of High Severity Acres
Current	0.8	6.4	0	0%
After 20 years	5.6	7.4	14	32%
After 40 years	15.2	11.7	10	100%

Cumulative Effects

Adding the effects of alternative 2 to the ongoing and reasonable foreseeable future actions described for cumulative effects of alternative 1 will not have substantial cumulative effects.

Alternative 3

Direct Effects and Indirect Effects

Proposed treatments for alternative 3 are described in chapter 2. The difference between the effects of alternatives 2 and 3 is due to less acreage being treated by dead tree removal, conifer reforestation, planting of browse species, and retention of additional snags being left on site in alternative 3. This alternative will remove an estimated 44,744 tons per acre of dead material greater than 3 inches from fire killed trees (38 percent removal), 6,244 less tons per acre than alternative 2. The effects of these treatments will be similar to those of alternative 2 as summarized in table 3-8 and provided in more detail in tables 6A through 6C of the Fire and Fuels resource report.

Table 3- 8: Flame lengths, fuel loads, and fire severity immediately after treatment, after 20 years, and after 40 years for alternative 3

Weighted Averages	Flame Length (Feet)	Fuel Load (Tons Per Acre <3")	Fuel Load (Ton Per Acre >3")	Percentage of High Severity Acres
Current	0.5	3.7	0	0%
After 20 years	5.0	6.7	15	25%
After 40 years	15.9	11.4	10	100%

Cumulative Effects

Adding the effects of alternative 3 to the ongoing and reasonable foreseeable future actions described for cumulative effects of alternative 1 will not have substantial cumulative effects.

Comparison of Effects

In the short term, alternatives have little difference in flame lengths, fuel loads, or proportion of high fire severity due to all surface vegetation being removed by the Little Deer Fire, and post-treatment vegetation just beginning to establish. Alternative 2 has slightly higher fuel loads of small material and flame lengths due to a greater number of acres treated by dead tree removal, while alternative 3 has slightly lower fuel loads and flame lengths due to the lower acreage treated by dead tree removal. In the short term, all three alternatives will have

flame lengths conducive to direct attack by hand crews, and will have only low severity fire effects across the landscape. Short-term effects of alternatives are displayed in table 3-9.

Table 3- 9: Comparison of short term effects of alternatives on fire and fuel analysis indicators

Alternative	Flame Length (feet)	Fuel Load (Tons Per Acre <3")	Fuel Load (Ton Per Acre >3")	Acres of High Severity	Percentage of High Severity Acres
1	0.8	6.3	0	0	0%
2	0.8	6.4	0	0	0%
3	0.5	3.7	0	0	0%

After 20 years, Alternative 1 will have lower small-fuel loads, flame lengths, and fire severity risk on 63 percent of the project. Alternative 1 will be primarily a low severity brush fuel model type within the high severity burned conifer areas of the Little Deer Fire, with no new conifer establishment through artificial reforestation methods. Planting browse species within the conifer planting areas will create a high severity fuel model due to brush and trees being mixed together. Of the action alternatives, alternative 3 has slightly lower small-fuel loads, flame lengths, and acreage of high severity fire effects due to less acreage being artificially reforested and planted with browse specie; this results in less area dominated by fuel model TU5 (timber with shrub understory). Alternative 3 is expected to have fewer acres of high fire severity than alternative 2 due to a smaller amount of planting. Alternative 2 will have the lowest large fuel load followed closely by alternative 3 with alternative 1 having large fuel loads well in excess of normal conditions. Alternative 1 will have flame lengths conducive to direct attack by handcrews but will decrease firefighter effectiveness and safety. Alternatives 2 and 3 will require use of equipment to effectively suppress a fire, but will have increased firefighter effectiveness and safety. Mid-term effects of alternatives are displayed in table 3-10.

Table 3- 10: Comparison of effects of alternatives on fire and fuel analysis indicators after 20 years

Alternative	Flame Length (feet)	Fuel Load (Tons Per Acre <3")	Fuel Load (Ton Per Acre >3")	Acres of High Severity	Percentage of High Severity Acres
1	2.9	4.0	24	226	6%
2	5.6	7.4	10	1334	32%
3	5.0	6.7	11	1091	25%

After 40 years, alternatives will have little difference in small-fuel loads, flame lengths, and proportion of high fire severity due to missing three fire return intervals, similar to conditions during the Little Deer Fire. The difference in flame lengths and fuel loads among the alternatives is primarily due to the different amounts of planting between alternatives 2 and 3; planting affects the ratio of brush and timber understory fuel models. Alternative 1 will still have the greatest large fuel load, in excess on normal conditions, with alternatives 2 and 3 being within normal conditions. Firefighter effectiveness and safety will be greatest in alternatives 2 and 3 and least in alternative 1 although all three alternatives will have flame lengths exceeding the threshold for direct attack, and will have high severity fire effects across the entire landscape.

Table 3- 11: Comparison of effects of alternatives on fire and fuels analysis indicators after 40 years

Alternative	Flame Length (feet)	Fuel Load (Tons Per Acre <3")	Fuel Load (Ton Per Acre >3")	Acres of High Severity	Percentage of High Severity Acres
1	18.0	10.2	18	4155	100%
2	15.2	11.7	6	4150	100%
3	15.9	11.4	6	4179	100%

Compliance with law, regulation, policy, and the Forest Plan

All alternatives comply with laws, regulations, policy, and direction of the Forest Plan as they relate to the fire and fuels resource as displayed in the Forest Plan consistency checklist, available on the project website.

Wildlife

The focus of this section is to depict the existing wildlife habitat conditions of the project, analysis and treatment areas that may be affected by the project proposed activities and the resulting direct, indirect, and cumulative effects to wildlife species and habitat in these areas. Wildlife species to be addressed are federally-listed, Forest Service Sensitive, Management Indicator, Survey and Manage, and migratory bird species.

Methodology

Methods for analysis focused primarily on assessment of wildlife habitats, habitat distribution, and potential disturbance created by the proposed activities. Assessments were made by reviewing habitat for each species in the field, performing species surveys, reviewing relevant scientific research and literature, and using GIS analysis. Field reviews of habitat in the project area were conducted in 2014 soon after the Little Deer fire.

Analysis Indicators

For all terrestrial wildlife species and their habitats, this section considers the direct and indirect effects of the alternatives to individuals, if known, or to potential habitat quantified by acres. Indicators include the acres of suitable habitat potentially affected by the alternatives, disturbance (e.g. noise), and relative rate of habitat regeneration.

Spatial and Temporal Context

The **Treatment Area** boundaries reflect the physical project footprint on National Forest System land, where proposed treatments will occur. **The Project Area** is the National Forest System land within the Little Deer fire perimeter. The **Analysis Area** varies by species and reflects the area within which the species can be directly and indirectly affected by the proposed action and alternatives. For most species, the Little Deer Fire burn perimeter, or project area plus one-half mile, is used for the analysis area.

Short-term temporary bounding is during or within five years of implementation of activities. Long-term temporal bounding for effects extends out to 30 years following inventory conditions (2014). Treatments are projected in the years 2015 and 2016 with post-treatment analysis ending in the year 2044. Since stand development is modeled for a 20-year period,

this is adequate time in which to display the differences in wildlife habitat between treating and not treating stands in the project area.

Affected Environment

The affected environment differs based on the scale at which it is being described. Within the treatment areas, especially those proposed for dead tree removal, there is currently little to no suitable habitat for species associated with late-successional habitat. This is because of the high intensity and severity of burn in the Little Deer fire and the limited amount of such habitat in the area before the fire began as described in the Wildlife resource report.

Components of habitat such as snags and coarse woody debris exist in the units proposed for dead tree removal but other components such as canopy closure are lacking. Therefore, the dead tree removal units currently do not contain habitat for species associated with late-successional habitat.

The Forest Service sensitive wildlife species known to be present in or adjacent to the treatment, project and analysis areas, or those for which suitable habitat is present, are displayed in Table 1. The federally-listed northern spotted owl, vernal pool fairy shrimp, yellow-billed cuckoo, or gray wolf, or species proposed for listing (Pacific fisher), are not included in the detailed analysis since there is no habitat for them (see Wildlife resource report).

Table 3- 12: Forest Service sensitive species in or adjacent to the project area, based on known occurrences or presence of suitable habitat

Species	Status	Known to Occur in Analysis Area?	General Habitat Description
Bald eagle	Forest Service Sensitive	No known nest or roost sites in the project area.	Nests in conifer forests containing old-growth components typically within 1 mile of water
Northern goshawk	Forest Service Sensitive	No known active nest sites or designated goshawk management areas.	Nests in dense, mid-mature and late successional conifer forests
Greater sandhill crane	Forest Service Sensitive	No known locations; there is habitat potential in the analysis area but outside the project area.	Wet Meadows
Pallid Bat	Forest Service Sensitive	No known locations, but occurrence is possible based on available snag habitat; large rocky outcrops, caves or mines are not known within or adjacent to project area.	Uses a variety of arid and or wooded habitats often in association with caves for roosting; will use caves, large trees, mines, buildings and bridges for roosting
Townsend's big-eared bat	Forest Service Sensitive	No known locations, but occurrence is possible based on available snag habitat; caves or mines are not known within or adjacent to project area.	Variety of wooded habitat often in association with caves for roosting; will use caves, large trees, mines, buildings and bridges for roosting
Fringed Myotis	Forest Service Sensitive	No known locations, but occurrence is possible based on available snag habitat; large rocky outcrops, caves or mines are not known within or adjacent to project area.	Uses a variety of arid and or wooded habitats often in association with caves for roosting; will use caves, large trees, mines, buildings and bridges for roosting
Western Bumble Bee	Forest Service Sensitive	No known locations. Low potential for suitable habitat.	Open meadow and aspen habitats

A summary of the information available on Survey and Manage species is provided in the Wildlife resource report. The project area does not contain suitable habitat for any Survey and Management species as addressed in the Wildlife resource report.

Wildlife Management Indicator Species for this analysis include those representing the snag species association as detailed in the Management Indicator Species report (Parts I and II). These species include the red-breasted sapsucker; hairy, white-headed, downy, pileated and

black-backed woodpeckers; and Vaux' swift. Snags are abundant in the treatment and project area as discussed in the Management Indicator Species report. In addition to the project-level management indicator species, several Forest emphasis species occur in the project area; these include deer and elk as discussed in the Wildlife resource report. For the Forest, migratory birds of management concern are federally-listed, Forest Service Sensitive, and Management Indicator species; effects to these are analyzed as part of the analysis of these species listed above. All of the documents referenced in this section are available on the project website.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

No project activities will occur in this alternative. Recovery of previous wildlife habitat will take several decades of time; wildlife habitat will be primarily grass, shrubs and snags in the short term. The long-term result is not likely to be forested stands that provide habitat for late-successional dependent species but instead be slow recovery of pine forests that existed in the area before the fire.

This alternative will result in no treatments and, therefore, no direct effects to individual wildlife or wildlife habitats are anticipated. The indirect effects expected will be those related to slow re-growth of forested habitats. Overall, effects to wildlife and wildlife habitats will result in reduced availability and distribution of stands that can develop into suitable habitat. Short-term effects to snag-associated species, particularly the black backed woodpecker, will be positive for about the first five years until most of the snags decay and fall (see the Vegetation section of this document and the Vegetation resource report) or food availability will decrease (see Wildlife resource report).

Cumulative Effects

The effects of past action and events, including those listed in appendix C, to wildlife and habitat are included in the description of the affected environment. Adding the effects of alternative 1 to the effects of ongoing and reasonable foreseeable future actions will produce no substantial cumulative effects to wildlife or habitat.

Alternative 2

Direct Effects and Indirect Effects

The effects to wildlife and habitat of this alternative include the implementation of project design features (table 2-1 of chapter 2) to minimize negative effects. Among other requirements, project design features designate the number of snags to be left standing in order to meet forest-wide Forest Plan standards. Snags are left in groups to provide structure and cover. Snags left in each unit will vary by unit size, shape, and land allocation. Snags from the largest size class will be chosen in each stand to make up the clumps for wildlife; however, not all of the largest trees in each unit will be retained because of safety concerns or implementation challenges. It is anticipated that the majority of the trees within dead tree removal units will be harvested since most burned at a high level of intensity with high severity effects.

Proposed dead tree removal in alternative 2 will not affect bald eagle habitat because these areas burned at high intensity and do not retain all of the components for suitable habitat, but the PDFs will retain large snags that are important for future eagle habitat or perch site. The project area didn't contain goshawk nesting habitat before the fire and it isn't likely to develop into goshawk habitat for several decades. Small areas of possible western bumble bee habitat will not be affected by the proposed activities. For snag associated management indicator species, there will be some degradation of snag habitat in these areas but the treatments will retain leave areas and individual snags at levels that meet or exceed Forest-wide standard snag levels. The proposed hazard tree removal treatments will degrade about 200 acres of snag habitat along system roads; however, the low number of trees treated per mile and the small number of acres of treatment will still allow for physical structure and perches for eagles and other bird species to move through the area. This hazard tree removal will maintain habitat conditions after treatment.

Snag habitat will be degraded with the proposed dead tree removal treatments; however, habitat will remain capable of providing habitat for snag associated species after dead tree removal. With the implementation of snag-related project design features, and the relatively small proportion of the project area being treated, alternative 2 will not limit the availability of large snag distribution for the possible pallid bat, fringed myotis, or Townsend's big-eared bat in the analysis area. Disturbance from both dead tree removal and hazard tree removal activities may temporarily affect roosting for these species.

Management indicator species associations are used to assess trends in specific habitat components important to many wildlife species. Each of the associations is made up of a set of species that require similar habitat components (e.g. snags) that may slightly vary (e.g. in snag size class or decay class). The Forest Plan EIS provides an assessment for retaining a particular minimum number and size of snags to meet the needs of snag associated species and minimize impacts. The assessment resulted in the development of Forest Plan standards (8-21 to 8-25, page 4-30). These standards require providing an average of five snags per acre, in a variety of size and decay classes, within the landscape; these snags need not be equally distributed. Implementation of wildlife project design features (table 2-1 in chapter 2) assures compliance with these standards to minimize potential impacts to snag-associated management indicator species.

Snag-associated species are closely tied to snags to meet their needs and the proposed dead tree removal activities will remove a portion of the snags in these units. However, it is not the intent of this analysis to determine the effects of the proposed activities on a particular Management Indicator species; rather it is our intent to analyze the potential effects to the species' habitat.

Alternative 2 will remove about 2,092 acres of snag-associated species habitat created by the Little Deer fire. Removal of snags in the dead tree removal units will not drop the number of snags below the Forest Plan standards because snags of varying size and decay will be retained within the treatment units. In addition, the placement of these retained snag areas reduces the distance between groups or individual snags and will provide snags for use by snag-associated species after treatment in the dead tree removal units. The Management Indicator Species report (parts I and II) provides more specific information on effects of this alternative to the species.

Cumulative Effects

The effects of past action and events, including those listed in appendix C, to wildlife and habitat are included in the description of the affected environment.

Adding the effects of alternative 2 in this project to the effects of ongoing and reasonable foreseeable future actions will reduce habitat for snag-associated species in the short term; in the long term, due to the deterioration of snags, this reduction will disappear.

Alternative 3

Direct Effects and Indirect Effects

The effects of alternative 3 are the same as for alternative 2 except alternative 3 increases the acreage of snag habitat to be retained in the short term because fewer acres of dead tree removal are proposed in this alternative. For snag-associated species, alternative 3 will remove about 1,598 acres of snag habitat created by the Little Deer Fire.

Cumulative Effects

Cumulative effects from adding the effects of alternative 3 to the effects of ongoing and reasonable foreseeable future activities are similar to those of alternative 2 even though more snags are retained in the short term in alternative 3.

Comparison of Effects

The effects of all alternatives to Forest Service sensitive species are displayed in table 3-13.

Table 3- 13: Species status, effects, and determination for all alternatives

Species	Status	Effects to Habitat	Determination
Bald Eagle	Sensitive	No habitat affected	No effect
Northern Goshawk	Sensitive	No habitat affected	No effect
Greater Sandhill Crane	Sensitive	No habitat affected	No effect
Pallid Bat	Sensitive	Roosting habitat may be temporarily affected by noise disturbance.	May affect individuals, but is not likely to lead to a trend towards Federal listing
Townsend big-eared bat	Sensitive	Roosting habitat may be temporarily affected by noise disturbance.	May affect individuals, but is not likely to lead to a trend towards Federal listing
Fringed Myotis	Sensitive	Roosting habitat may be temporarily affected by noise disturbance.	May affect individuals, but is not likely to lead to a trend towards Federal listing
Western Bumblebee	Sensitive	No effect to habitat	No effect

Table 3- 14: Comparison of short-term effects to snag-associated MIS species

Effects to Habitat	Alternative 1	Alternative 2	Alternative 3
Habitat removed	0 acres	2,092 acres	1,598 acres
Habitat retained	4,842 acres	2,750 acres	3,244 acres

Comparison of short-term effects of alternatives on snag-associated Management Indicator Species indicates that alternative 1 provides most short-term habitat, alternative 3 provides a moderate level of short-term habitat and alternative 2 provides a slightly smaller amount of

short-term habitat than alternative 3. In the long term, there is little difference among alternatives with alternatives 2 and 3 providing more acres of habitat through reforestation of harvested areas.

Compliance with law, regulation, policy, and the Forest Plan

All action alternatives will be compliant with the Forest Plan guidelines aimed at minimizing short-term impacts to individuals and providing for long-term wildlife population persistence as displayed in the Forest Plan consistency checklist, available on the project website. The action alternatives propose measures which will move toward restoring ecosystem processes in the project area.

Compliance with the Migratory Bird Treaty Act is assured by compliance with the Migratory Bird Memorandum of Understanding. The Wildlife resource report discloses this compliance and concludes that the analysis of Forest Service Sensitive and Management Indicator Species birds is sufficient to ensure compliance with the Migratory Bird Treaty Act.

Compliance with the Endangered Species Act is not pertinent to this project since there are no known occurrences and no suitable habitat for federally-listed species in the project or analysis area. Compliance with the 2001 Record of Decision (as amended) concerning survey and manage species is also not pertinent as there are no known occurrences and no suitable habitat for survey and manage species.

Botany

The Little Deer Project Botany Biological Assessment, Biological Evaluation, Survey and Manage Review, Noxious Weed Risk Assessment, and pre-field documents are summarized and referenced here and are part of the Botany resource report which is available on the project website. The purpose of this section is to evaluate the Little Deer project in sufficient detail to determine its effects on Endangered, Threatened, Proposed, Sensitive, and Survey and Manage plant species as well as determine the risk of introducing or spreading Noxious Weed species.

Methodology

An office pre-field review was conducted to determine if the project is within the range of any federally listed Threatened, Endangered, Proposed, Candidate, Sensitive, or Survey and Manage plant species for the Klamath National Forest, and if suitable habitat for all species of concern existed in the project area. Additionally, the review indicated whether any species of concern or invasive plant species were known to be present within the proposed project area. All species listed for the Forest were considered for this review. The Forest Noxious Weed and Non-native Invasive Plant List (USDA 2013b) was used for the invasive species review.

A preliminary field review was also conducted to confirm office predictions. The field review confirmed lack of suitable habitat for any species of concern. Assumptions specific to species of concern and invasive species are in the Botany resource report. The presence of any invasive species within the project area could not be confirmed.

Data sources used in the analysis include:

- National Databases: Natural Resources Information System (NRIS) for all species of concern, and non-native invasive species.
- Paper-based Gooseneck Ranger District Sensitive Plant location and survey atlas; noxious weed location and survey atlas.
- California Natural Diversity Data Base (CNDDB) records through RareFind 5, California Department of Fish and Wildlife.
- US Fish and Wildlife Service List, Arcata Office, species of Concern.
- Klamath National Forest GIS layer: Activities.

Analysis Indicators

Threatened, Endangered, Proposed, Sensitive, and Survey & Manage plant species:

There are no plant species federally listed as Threatened, Endangered, Proposed, Candidate, Sensitive, or Survey and Manage within the project area (USDA 2014c); therefore, there will be no impacts to analyze and indicators for such an analysis are not needed.

Noxious Weeds:

The following indicator will compare alternatives:

- Risk of introduction and/or spread of non-native invasive plants measured by the elimination of risk or a rating of high, medium, or low risk.

Spatial and Temporal Context

Noxious Weeds:

The spatial boundary of the analysis area will be the project boundary; weed sites outside this area but in close proximity will not be affected by, nor will they have an effect on, the project because they are beyond dispersal distances and there are no associated project activities in those areas. It is expected that effects from potential introductions of non-native invasive species will be evident within three years in the short term, and five to ten years in the long term.

Affected Environment

There are no known sites and surveys were not triggered for any species listed as Threatened, Endangered, Proposed, Sensitive, or Survey and Manage. The field review to determine presence of non-native invasive plants revealed no species present in the project area; however, cheat grass occurs in areas on private and federal land adjacent to the project area and may spread to the project area. The Little Deer project area is highly vulnerable to the invasion of non-native invasive plant species because of the severe fire intensity that removed all vegetation and litter layers that normally compete with and impede the establishment of invasive species. The ground has no buffer from invasion of any species that may be introduced.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Alternative 1 will eliminate the direct risk of introduction and/or spread of invasive species from project activities since none will take place; however, there will still be the indirect risk of introduction from non-project dependent vectors such as public traffic, wind, birds, and mammals. The likelihood that cheat grass will invade the project area regardless of whether or not the project is implemented also exists, due to its proximity immediately adjacent to the project area. Without the seeding of native perennial grasses, there will be nothing to help reduce the potential for invasion of cheat grass into the severely burned and vulnerable landscape. The risk for introduction and/or spread of non-native invasive plant species under alternative 1 is high.

Cumulative Effects

The logging on private lands within the boundaries of the Little Deer project, as discussed in appendix C, have the potential to introduce and/or spread invasive species as there are no preventative measures for invasive species required on private land. Adding the effects of alternative 1 to this potential negative effect can result in a substantial cumulative effect if an invasive species that is very difficult to control is introduced on private land and then spread to Forest lands. This can result in a landscape that will take a long time to recover.

Alternative 2

Direct Effects and Indirect Effects

The direct effect of alternative 2 in relation to invasive species is that the proposed seeding of shrub and native perennial grass species will be beneficial in minimizing the invasion of cheat grass in the areas that are seeded by providing competition for resources. An indirect beneficial effect will be in areas disturbed by equipment where cheat grass may germinate during the first spring post-fire. This equipment disturbance will open up these areas for the establishment of other species. This will help in the recovery and reforestation by species proposed for planting.

For alternatives 2, project design features have been incorporated to minimize the introduction and potential spread of noxious weed infestations. These project design features (NNIS-1 through NNIS-3 in table 2-1) will reduce the risk of spreading infestations into or within the project area, and are mandatory in all contracts. The risk of introduction and/or spread of non-native invasive plant species for the project actions in alternative 2 are low.

Cumulative Effects

Adding the effects of alternative 2 to the effects of private land projects will reduce negative cumulative effects to the invasion and spread of noxious weeds.

Alternative 3

Direct Effects and Indirect Effects

Alternative 3 does not include any seeding of native perennial grasses that may provide a beneficial direct effect in reducing the scale of cheat grass invasion. The indirect beneficial effect is the same as in alternative 2. Implementation of project design features (NNIS-1 through NNIS-3 in table 2-1) will reduce the risk of spreading infestations into or within the project area.

Cumulative Effects

Adding the effects of alternative 3 to the effects of the logging on private lands will result in cumulative effects similar to those of alternative 1, with the benefit of proposed activities on a portion of the project area that can reduce cheat grass invasion and spread.

Determination Statements

Threatened, Endangered, or Proposed plant species:

The Little Deer project is not within the range, nor is there any habitat for any federally listed Threatened, Endangered, or Proposed plant species. *It is my determination that the Little Deer project will not affect Threatened, Endangered, or Proposed plant species.*

Sensitive plants species:

The Little Deer project will not affect Sensitive plant species nor lead to a trend towards listing of these plant species.

Survey and Manage plant species:

The Little Deer project will not affect species listed as Survey and Manage.

Noxious Weeds:

There is a low risk that action alternatives in the Little Deer project will cause the introduction or spread of Forest listed noxious weeds.

Compliance with law, regulation, policy, and the Forest Plan

Threatened, Endangered, Proposed, and Sensitive Plants:

The Little Deer project complies with section 7 of the Endangered Species Act, as amended, in the preparation of a Biological Assessment, and Biological Evaluation; Forest Service Policy (FSM 2670), and Forest Plan standards for Sensitive plant species as displayed in the Forest Plan consistency checklist, available on the project website.

Survey and Manage Plants:

There is no habitat or known sites of survey and manage plant species in the Little Deer project; therefore, this project complies with the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines as there is no habitat or known sites of survey and manage plant species in the project area.

Noxious Weeds

The Little Deer project complies with Executive Order #13112 and the Forest Service Manual 2900. It also complies with and Forest Plan standards for noxious weed species as displayed in the Forest Plan consistency checklist, available on the project website.

Range

Methodology

Prior to the fire, utilization data was taken annually using the landscape appearance method. This method uses a set of seven utilization classes; each with detailed descriptions of class qualifications, occurrence of each class is counted and then averaged. Immediately following the fire, ocular estimations were made to assess the amount of remaining vegetation that will be available for grazing.

Analysis Indicators

The effects of the project on rangeland resources will be evaluated using two analysis indicators:

- Capable acres available during the grazing season: measuring the number of head months (HM) that are permitted on the allotment during the grazing season. This will be either a decrease in grazing or an equal level.
- Number of acres of native grasses/forbs.

Spatial and Temporal Bounding of Analysis Area

The spatial limits of this analysis will be limited to the Horsethief grazing allotment in which the project area is located. This will allow for analysis of the total effect to the entire rangeland resource that will be associated with the project. Due to the nature of grazing permits, effects will be measured in the near term of 10 years or the length of a grazing permit and 40 years to consider trend of the resource.

Affected Environment

Currently within the Little Deer project area there is little to no ground-covering vegetation with a large percentage of the area experiencing fire temperatures that cause loss of viability of the seed bank; this loss will make it difficult to have natural regeneration of vegetation. The project area is within the Horsethief grazing allotment (analysis area) that encompasses 26,020 acres; 56 percent of the analysis area is National Forest land and the remaining 44 percent is private. Of the total allotment, 5,503 acres burned which is about 21 percent of the total analysis area. The permitted livestock use for the Horsethief grazing allotment is 100 cow/calf pairs from June 1st thru September 30th totaling 400 head months (HM) within the grazing season. Given the pre-fire range management, forage utilizations were maintained within allowable use as noted in table 1 or modifications were made to ensure compliance.

Table 3- 15: Percentage of forage utilization at end of grazing season within the project area

Location	2012	2011	2010	2009
Within the project area	14%	29%	28%	38%

After the Little Deer fire, there is much less browse vegetation than before the fire so capable acres for grazing within the project area are limited and little if any grazing currently occurs.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

With this alternative, no project actions will take place; some brush is likely to come back (rabbit brush, for example) but this brush is not the most effective vegetation for range. By taking no action within the project area, there will be an increased likelihood of cheat grass seeding in, causing a change in both the feed value and timing for large ungulates (such as cattle, deer and elk). This change will also diminish the successful establishment of native grasses and forbs that serve an important role in feed quality for both livestock and wild ungulates, especially in the early summer months when nutrient requirements are peaked.

The increased likelihood of cheat grass within the fire area will also increase the likelihood of cheat grass to spread beyond the fire area through multiple transmission causes, both manmade and natural. This increased spread potential will have detrimental effects on the native plant communities within the larger analysis area as cheat grass out-competes native grasses for resources by taking advantage of moisture earlier in the growing season. Allowing invasive species to flourish will create a deficit of palatable forage and, therefore, over time lead to a decrease in the carrying capacity of large ungulates within the analysis area.

Cumulative Effects

Currently the Horsethief allotment is being analyzed; the proposed action in that analysis will decrease grazing in both Fox Flat and Bulls Meadow (outside the Little Deer project area but within the analysis area). Adding the effects of alternative 1 (as disclosed above) to this small reduction in available acres will not have substantial cumulative effects because the exclusion areas are small in acreage, provide only minimal amounts of forage for the allotment, and there is sufficient forage in the rest of the allotment to maintain capable acres and head months.

Alternative 2

Direct Effects and Indirect Effects

The availability of forage in the project area will vary depending on the success of native grass seeding and somewhat on the planting of shrubs such as bitterbrush. The short-term effects will be minimal due to the ability to move cattle to locations primarily away from the project area by adjusting salting locations and monitoring and moving cattle if they begin to congregate within the project area. The decreased utilization of the project area will have minimal effects to the other portions of the allotment due to the historic low utilization in other portions of the allotment. In the long-term, there will be a small but not substantial increase in the acreage of native grasses and forbs and no substantial effect to capable acres or head months.

Cumulative Effects

Adding the effects of alternative 2 to the ongoing and reasonable foreseeable future actions identified in alternative 1 will not have substantial cumulative effects to range.

Alternative 3

Direct Effects and Indirect Effects

The main source for short- and long-term forage availability in this alternative will be primarily dependent on the natural seed sources outside of the dead tree removal areas. These sources are both the surviving seed bank and the natural seed distributing methods due to the decrease in proposed native grass seeding. The decreased native grass seeding and brush planting in the project area will increase the likelihood of non-native annual grass conversion and decreased forage palatability and quality during the grazing season.

Cumulative Effects

Cumulative effects of adding the effects of alternative 3 to the effects of ongoing and reasonable foreseeable future actions identified in alternative 1 are not substantial.

Comparison of Effects

Alternative 1 will have the greatest likelihood of negative long-term effects to rangeland resources due to the lack of native grass seeding and brush planting. This will delay the successional process and decrease the forage availability within the project area. Alternative 3 has some grass seeding and planting of shrubs within the dead tree removal areas but not outside these areas.

Alternative 2 includes the largest amount of grass seeding and shrub planting both within and outside the dead tree removal areas and the greatest possible positive effect on rangeland resources.

Table 3- 16: Comparison of alternatives based on acres of treatments that may affect range

Treatment	Alternative 1	Alternative 2	Alternative 3
Mahogany and brush planting	0	490 acres	160 acres
Grass seeding	0	513 acres	239 acres

Compliance with law, regulation, policy, and the Forest Plan

The project is in compliance with law, policy, regulation related to rangeland resource, and the standards for the Forest Plan as displayed in the Forest Plan consistency checklist, available on the project website.

Soils

Methodology and Analysis Indicators

Analysis of the effects of individual management activities on the soil resource (soil productivity and soil ecosystem functionality) is guided by the Forest Plan standards and FSM 2500, Chapter 2550, Supplement 2500-2012-1. Four indicators were chosen that

address relevant issues in the Little Deer Project and measure compliance with Forest Plan standards. The indicators include: soil organic matter, soil structure, miles of temporary roads on existing roadbeds, and percent of treatment acres in main skid trails and landings.

The unit measures for soil organic matter and soil structure indicators are acres not meeting desired conditions. Soil organic matter desired conditions are not met when major portions of the area have had the upper soil layer displaced or removed to a depth of 8 inches and an area large enough to affect productivity for the desired plant species (100 square feet). Soil structure desired conditions are not met when major portions of the area have reduced infiltration and permeability capacity indicated by soil structure and macro-porosity changes. Infiltration is the process by which water on the ground surface enters the soil. Soil macro-porosity is the amount of the soil that is composed of larger pores which are important for soil water movement and gas exchange.

The proposed activities for the project were categorized into similar activity types. For example, all treatments using ground-based equipment were lumped into “Ground Based Tractor Logging with Associated Landings.” The projected acres not meeting desired conditions for each indicator and activity type were determined from monitoring data collected from previous projects on the Forest using the National Forest Soil Disturbance Monitoring Protocol. Percent of treatment acres in main skid trails and landings were also determined from monitoring previous vegetation management projects on the Forest. Miles of temporary roads on existing roadbeds is described in chapter 2.

Spatial and Temporal Context

For all four soil indicators, the analysis area is bounded by the project activity treatment stands, where project activities take place. The analysis is further bounded in time by the foreseeable future period during which effects of this project could persist as detectable, significant effects. Soil organic matter can take years to decades to rebuild after it is lost through displacement or erosion. Once compacted, structure can remain affected for decades as biological and physical processes work to break up compaction. Some skid trails, landings, and temporary roads are often still evident on the landscape for decades after treatment. The temporal boundary for soil organic matter, soil structure, miles of temporary roads on existing roadbeds, and percent of treatment acres in skid trails and landings is 30 years.

Affected Environment

Soils in the Little Deer project area comprised of loams, gravelly loams, sandy loams, and sands developed from volcanic ash and weathered basalt or andesite. The majority of the soils in the project area are deep sandy loams derived from volcanic ash. These soils have a low compaction hazard rating and rated as having low productivity due to high amounts of volcanic cinders. Soils to the north of Little Deer Mountain are gravelly loams formed from weathered andesite and basalt and have moderate compacting and productivity rating. Soils on the east side of the project area are loams formed from weathered andesite and basalt and have high compaction hazard rating and low to moderate productivity rating. Little Deer Mountain and lava flows to the southwest of Little Deer Mountain are rated as non-productive lands composed of cinders and un-weathered bedrock.

Erosion hazard rating is a relative measure of the soils’ sensitivity to erosion processes. Soil disturbance has the potential to increase the erosion hazard because soil cover is generally reduced. Erosion hazard rating was calculated for each of the treatment units to estimate the

potential erosion hazard for a given soil type. The maximum erosion hazard rating was calculated for soil that is completely bare to determine the risk of soil loss in areas without protection from soil cover. The maximum erosion hazard rating in the majority of the project area is moderate due to gentle to moderate slopes and sandy soil textures. Cinder lands and lava flows are rated as having low erosion hazard rating because these areas are well armored with surface rock.

The erosion hazard rating for the current conditions of treatment areas was calculated using data collected on existing levels of soil cover and from soil burn severity mapping. Areas with high and moderate soil burn severity have reduced levels of soil cover and therefore have current erosion hazard ratings equal to maximum erosion hazard rating.

Site data was stratified to collect information on the existing conditions for a variety of soil types in moderate and high soil burn severity areas. Soil texture, soil cover, rock content, soil burn severity, disturbance from old skid trails, landings, roads, as well as disturbance from fire suppression activities was evaluated along five transects in the project area. Existing soil cover averaged 32 percent in units with high soil burn severity and 61 percent in units with moderate soil burn severity. The types of disturbance that were found include topsoil displacement, compaction, and rutting on dozer lines from fire suppression activities, old road beds, skid trails, and landings. No signs of soil erosion were present on any of the surveyed units.

Desired conditions for soil organic matter and soil structure are currently met on an average of 96 percent of the proposed treatment area. Ground disturbance from previous timber sales and fire suppression activities account for a minor portion of treatment units.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Direct and indirect effects of this alternative will be a slow natural recovery of soil cover as vegetation re-establishes on the moderate and high soil burn severity areas. Soil organic matter will remain intact unless severe storm events result in the loss of large amounts of topsoil. Soil structure conditions will remain the same in the short term, with very slow long-term natural recovery of old skid trails and landings.

Cumulative Effects

Cumulative effects are influenced by the direct and indirect effects of this alternative added to the effects of applicable past, ongoing, and reasonably foreseeable future actions. Past actions including timber harvest and fire suppression are evident on the landscape in the project area and are reflected in the discussion of the affected environment. The Horsethief grazing allotment project is an ongoing and reasonably foreseeable future action that is being planned in the project area. Current grazing use is light in the areas proposed for treatment in the Little Deer project. The Horsethief grazing allotment project is not expected to increase the level of use in the Little Deer project area so cumulative impacts to soil indicators are not expected to be substantial.

Alternative 2

Numerous scientific studies and review articles have been written describing the impacts of salvage logging (dead tree removal) on soil functions. These studies and review articles conclude that salvage logging occurs on soil that is disturbed and more vulnerable to additional disturbance than green timber sales (Lindenmayer & Noss, 2006) and that salvage logging operations damage soils by compaction, displacement, and increased topsoil erosion (Beschta 1995; Karr et al., 2004). A study on the Biscuit Fire in Southern Oregon found that salvage logging significantly increases both fine and coarse downed wood fuel loads, elevating the short term risk of damage to soil from re-burn (Donato, et al., 2006).

Additionally, research has shown that salvage logging removes large standing trees that are an important component to soil biological processes and nutrient cycling (Karr, et al., 2004; Marañón-Jiménex et al. 2013). Researchers have concluded that salvage logging negatively impacts recovery processes with the intensity of such impacts depending upon the nature of logging activity (Noss et al. 2006). The Soil resource report acknowledges the negative impacts of salvage logging on soil functions and quantifies these impacts using monitoring and relevant science.

Direct Effects and Indirect Effects

Ground-based tractor logging, roadside hazard tree removal, site preparation, and temporary road reconstruction will impact the number of acres not meeting desired conditions for soil organic matter and soil structure. For alternative 2, the acres that do not meet desired conditions for soil organic matter and soil structure are 367 and 232. These acres include impacts from old skid trails, landings, and roads as well as estimated additional acres from activities proposed in alternative 2. Reusing skid trails, landings, and existing roadbeds will limit most of the negative impacts from project activities to areas of existing soil disturbance. Ground based tractor logging will result in reduced levels of soil cover on skid trails and landings but design features will reduce the potential for soil erosion. Increased compaction and soil displacement will lead to a loss of soil function on main skid trails landings and temporary roads. Project design features (table 2-1) including slope limitations, waterbar requirements, disturbance limitations, minimizing impacts to coarse woody debris, and subsoiling will minimize impacts to soil erosion and productivity.

Alternative 2 proposes to use 9.3 miles of temporary roads on existing roadbeds. Reusing existing roadbeds will limit additional disturbance from project activities as these currently do not meet desired conditions for soil organic matter and soil structure. Project design features to grade, out-slope, block, and provide adequate soil cover will limit impacts to temporary roads on existing roadbeds.

The percent of treatment acres in main skid trails and landings is expected to be about 8 percent. The majority of these will be on reused existing skid trails and landings. Implementation of project design features will reduce the potential for negative effects from these activities. Alternative 2 will maintain adequate soil cover, protect soil organic matter, maintain soil structure at levels sufficient to protect soil productivity, and prevent soil erosion.

Monitoring from previous projects has shown that implementation of project design features for ground-based logging and temporary road use are effective at minimizing impacts to soil functions. Alternative 2 will maintain adequate soil cover, protect soil organic matter, and maintain soil structure at levels sufficient to protect soil productivity and prevent soil erosion.

For more detail on how the proposed activities may impact soil function, please see the Soil resource report.

Cumulative Effects

Past actions including timber harvest and fire suppression are evident on the landscape in the project area and are reflected in the discussion of the affected environment. The effects of ongoing cattle grazing and the Horsethief grazing allotment project are the same as discussed for alternative 1. Adding the effects of alternative 2 to the effects of past, present, and reasonably foreseeable future actions is not expected to have substantial negative effects on soil desired conditions and, therefore, no substantial negative cumulative effects will occur.

Alternative 3

Direct Effects and Indirect Effects

The proposed activities with a potential to impact soil organic matter and soil structure are the same as alternative 2 but the number of acres treated with ground-based tractor logging are decreased and planting/seeding proposed only in the dead tree treatment areas. For alternative 3, the acres that will not meet desired conditions for soil organic matter and soil structure are 315 and 207. These acres include impacts from old skid trails, landings, and roads as well as estimated additional acres from activities proposed in alternative 3. The miles of temporary roads on existing roadbeds are slightly reduced at 9 miles. The percent of treatment acres in main skid trails and landings is expected to be slightly reduced at 7 percent.

Cumulative Effects

Adding the effects of alternative 3 to the effects of past, present, and reasonably foreseeable future actions is not expected to have substantial negative effects on soil desired conditions and, therefore, no substantial negative cumulative effects will occur.

Comparison of Effects

Table 3- 17: Comparison of effects of alternatives on soil indicators

Indicator	Alternative 1	Alternative 2	Alternative 3
Acres not meeting desired conditions for soil organic matter	87	367	315
Acres not meeting desired conditions for soil structure	87	232	207
Miles of temporary roads on existing roadbeds	0	9.3	9
Percent of treatment area in main skid trails and landings	0	8%	7%

Compliance with law, regulation, policy, and the Forest Plan

Forest Plan standards for soils will be met for all alternatives as displayed in the Forest Plan consistency checklist, available on the project website. The number of acres that do not meet desired conditions for soil organic matter and soil structure is minor in relation to the total treatment area, and is reduced to the extent possible with project design features.

Water Quality

Methodology

Overview of Methodology

The effects of the project and its alternatives were analyzed using field visits, Geographic Information System (GIS) reports and modeling. Riparian Reserve widths were determined using the interim widths in the Forest Plan (standard MA10-2, page 4-108). There are no unstable areas in the project area and the risk of landsliding is very low (less than one percent); therefore, effects to landslide risk, including results from the GEO (mass-wasting) cumulative watershed effects model, are not discussed further in this analysis. Cumulative watershed effects models were used to evaluate the effects of soil erosion (Universal Soil Loss Equation – USLE) and to index watershed disturbance (Equivalent Roaded Acres – ERA). The assumptions and caveats of the models can be found in Cumulative Watershed Effects Analysis: Quantitative Models for Surface Erosion, Mass-wasting, and ERA/TOC (USDA Forest Service 2004). Model results fall on a continuum. The models are indexed using a “risk ratio.” The threshold of concern for the risk ratio for both models is 1.0. The threshold of concern does not represent the exact point at which adverse cumulative effects will occur. Rather it serves as a “yellow flag” indicating increasing susceptibility for adverse effects to beneficial uses in a watershed.

Analysis Indicators

The analysis indicators were developed to illustrate compliance with law, policy and regulation. These include desired condition and limitations from the Forest Plan, as well as regulations and requirements related to the Clean Water Act.

Likelihood of Meeting Desired Condition for Riparian Reserves

The Forest Plan and the Aquatic Conservation Strategy Objectives outline the desired conditions for the Riparian Reserve function and will be analyzed using a combination of metrics. Very likely to meet desired conditions means there is a greater than 80 percent probability. Likely to meet desired conditions is between 60 and 80 percent. The likelihood of meeting desired condition is probable if between 30 and 60 percent. It is unlikely if it is between 10 to 30 percent and very unlikely if less than 10 percent.

- Changes to channel condition/geomorphology is effected by the presence of large wood, rocks and live vegetation that stabilizes banks and minimizes the introduction of fine sediment. The analysis will include acres of activities in the Riparian Reserve and the potential for direct or indirect effects to channel condition from project activities.
- Changes to Riparian Reserve vegetation will be analyzed by the likelihood of re-vegetation of the Riparian Reserve and the type of vegetation expected.
 - Changes to spatial and temporal connectivity within and between watersheds will be analyzed by the estimating the potential for coarse woody debris recruitment and the estimated rate of recovery of large trees and canopy cover in Riparian Reserves.
 - Changes in peak flow will be analyzed using the ERA model and Grant et al. (2008) to estimate the magnitude of change.

Risk to Beneficial Uses

The Total Maximum Daily Loads (TMDLs) for the Shasta River and Klamath River as well as compliance with the waiver for timber harvest (North Coast Region Water Quality Control Board (Water Board 2010)) address water quality requirements. The following metrics were developed to determine effects to beneficial uses and Clean Water Act compliance. A very low risk is where beneficial uses are not likely to be impacted at all by the actions or are likely to be enhanced. A low risk is when beneficial uses are not likely to be measurably affected. For a moderate risk there is likely to be a short-term nuisance impact at the site scale but will recover in less than five years. For a high risk there is likely to be short-term nuisance impacts at a watershed scale but will recovery in less than five years. Finally, a very high risk is when there is likely to be an adverse effect to beneficial uses at any temporal or spatial scale.

- Stream temperature is often used as an analysis indicator of risk to water quality. However, in the Little Deer project area, the only stream is First Creek. The beneficial uses supported by First Creek are not temperature-dependent nor does the temperature of the water in First Creek impact beneficial uses in any tributaries of the Klamath River. Therefore, effects on stream temperature will not be analyzed further for the Little Deer project.
- Changes to sediment regime and effects to beneficial uses will be analyzed using the USLE model.

Spatial and Temporal Context

The spatial scale for water quality is bound by six 7th field drainages that intersect the project area; these are Upper First Creek, Penoyar Creek, Lower First Creek, Horsethief Creek, Grass Lake Northeast, and Grass Lake South and are chosen because the cumulative watershed effects models are calibrated to this scale and it is the smallest unit where water quality effects can reasonably be measured. The scale for analyzing effects to the Riparian Reserve function is bound by the area proposed for treatment and the channel reaches immediately downstream of the treatment area. This is essentially the reach scale which is the scale at which the Riparian Reserve desired conditions are described.

The temporal scale is considered short-term for effects lasting less than five years or long-term where they persist for five years or more. The split between short-term and long-term is based on the recovery rates predicted in the cumulative effects models.

Affected Environment

There are a constructed stock pond and a groundwater well in the project area. The stock pond is a small shallow hole dug to provide seasonal water for livestock. The groundwater well, Murphy Well, is an open, shallow well that is defined by culvert-like casings. There is no evidence of surface water associated with the well. The only stream-related Riparian Reserve in the project area is along First Creek, an intermittent creek that flows in the early spring. The channel is well defined and about 10 feet across in the northern portion of the project area. Toward Highway 97, the channel becomes a swale with little evidence of annual scour. The creek runs in a ditch next to Highway 97, crosses the highway via a culvert and ends about two miles southwest of the highway in a vernal pool outside the project boundary.

The Little Deer wildfire this past summer shaped the existing condition of the watersheds and the Riparian Reserves. Upper First Creek, Horsethief Creek, and Grass Lake Northeast 7th

field watersheds include less than 10 percent of the watersheds' burned areas. Eighteen and seventeen percent of the Grass Lake South and Penoyar 7th field watersheds burned respectively. Lower First Creek was the most affected by the fire with 47 percent of the watershed being burned, much of it with moderate to high soil burn severity. Soil burn severity is used in water quality analysis, as opposed to vegetation burn severity, because soil burn severity is intended to be used in the watershed response to a fire.

Likelihood of Meeting Desired Conditions for Riparian Reserves

Channel Geomorphology

First Creek's channel shows evidence of annual scour through the project area. The channel is rocky with banks that are steep and undercut in places but there is no evidence of incision or entrenchment. The vegetation along the channel was removed by the Little Deer fire, leaving First Creek not entirely meeting desired condition as defined by the Forest Plan. The grasses and shrubs have started to re-sprout but the most of the trees in the Riparian Reserve are fire-killed. There is very little woody material in the Riparian Reserve and there was nothing that met the Forest Plan requirements for coarse woody debris observed during field reconnaissance.

Riparian Reserve Vegetation

Pre-fire, the Riparian Reserve in First Creek was a plantation. The trees were primarily ponderosa pine less than 16 inches in diameter at breast height with fairly uniform spacing. Most of these trees are now fire-killed.

Connectivity

Connectivity for terrestrial and semi-aquatic species was limited before the Little Deer fire and is even more limited after the fire. The fire killed most of the plantation conifers in the Riparian Reserve. These trees were primarily less than 16 inches in diameter as noted above. They were short and did not meet the Forest Plan recommendation for coarse woody debris of 20 inches in diameter and 40 cubic feet in volume (standard 6-16, page 4-24). Post-fire, most burned trees do not meet this coarse woody debris recommendation.

Peak Flow

Peak flows are expected to increase by as much as 130 percent over pre-fire conditions for the winter of 2014/2015. Then the peak flows will increase by between 10.5 percent and 14 percent after the first winter and remain at this level for about the next 10 years.

Risk to Beneficial Uses

All tributaries to the Klamath River are listed under section 303(d) of the Clean Water Act for stream temperature impairment (California State Water Quality Control Plan (Basin Plan 2010)); this means that beneficial uses are not being met in the Klamath River and its tributaries. The Little Deer project area has one stream that has limited hydrological connectivity with higher order streams (see description above) in the Klamath River basin. The stream only flows during the snowmelt season and does not have any fish or shellfish habitat. Therefore, effects to beneficial uses due to conditions in the project area are limited to agriculture and wildlife habitat.

The amount of soil loss and sediment delivery to First Creek is higher than previously found due to the Little Deer fire. The delivery of sediment to the stream is between 75 and 112 cubic yards per year based on results of the USLE model. The risk ratios for Upper and Lower First Creek 7th field watersheds are over the threshold of concern. The amount of sediment delivery may cause a nuisance effect to beneficial uses. This will include additional sediment delivered to diversion ditches used for agricultural purposes downstream of the fire and turbid water delivered to the vernal pool at the end of the creek.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Likelihood of Meeting Desired Conditions for Riparian Reserves

Channel Geomorphology

The dead and dying trees in the Riparian Reserve will begin to fall over the next 5 years and contribute to the woody material in the Riparian Reserve and the stream channel of First Creek. However, in general, the trees are not large enough to meet the Forest Plan definition for coarse woody debris. Despite that, the wood will serve to capture sediment, slow stream flows and stabilize banks. Next spring, the banks will be susceptible to undercutting due to increased runoff and reduction of stabilization from roots from grasses and shrubs. Some of the grasses and shrubs will recover over the summer of 2015 and they will help to stabilize the banks of First Creek similar to pre-fire conditions until the conifer roots begin to decay (after about 10 to 15 years). After that, the banks will be susceptible to erosion and instability until conifers regenerate in the Riparian Reserve.

Riparian Reserve Vegetation

The conifers will be slow to regenerate because the moderate and high severity fire left a lack of seed source in the Riparian Reserve (as in the rest of the project area as discussed in the Vegetation, Range and Botany sections). The potential to recruit large wood over the long-term will be reduced substantially after 5 years as the fire-killed trees fall.

Connectivity

The fire-killed trees that fall will be woody material in the stream but the likelihood of long-term conifer recruitment under natural recovery is low due to the lack of seed crop and competition with shrubs. This will limit connectivity within and between watersheds until large conifers populate the Riparian Reserve and coarse woody debris is available in the channel.

Peak Flow

The peak flows will be elevated for about 10 years after the fire. After that, the peak flows will recover to at least pre-fire conditions in about 20 years. Under pre-fire conditions, the peak flows are increased by less than 10 percent which is the detection level of the peak flow model used in this analysis.

Risk to Beneficial Uses

The amount of soil loss and sediment delivery to First Creek will continue to be elevated as described in the affected environment and risk ratios for Upper and Lower First Creek will continue to be over the threshold of concern. The amount of sediment delivery may continue to cause a nuisance effect to beneficial uses in the short-term as described in the affected environment section.

Cumulative Effects

The ongoing and reasonable foreseeable future actions in the 7th field watersheds analyzed that are considered in the assessing the cumulative effects to water are First Creek Forest Health Management project, Erickson Vegetation, Fuels, and Roads Management project, Pomeroy project, Horsethief Grazing Allotment project and fire salvage on private lands (as described in appendix C). The effects of past actions and events, including the Little Deer fire, are represented by the affected environment.

Likelihood of Meeting Desired Conditions for Riparian Reserve

The ongoing and reasonable foreseeable future actions do not intersect the Riparian Reserve or Streamside Management Zone (for private lands) of First Creek directly. So the cumulative effects for the channel geomorphology, Riparian Reserve vegetation, and connectivity include the direct and indirect effects of alternative 1 added to the past and current situation as represented by the affected environment.

The channel geomorphology will be unstable and susceptible to high flows over the long term as the tree roots begin to decay and are not replaced by large trees in the Riparian Reserve. The Riparian Reserve vegetation will comprise mainly of shrubs and grasses for the long term. The establishment of large trees in the Riparian Reserve will be slow and alternative 1 does nothing to improve the recruitment of trees in the Riparian Reserve over natural recovery. There is currently little woody material to promote connectivity in the Riparian Reserve and there was not material observed in the Riparian Reserve that met the definition of coarse woody debris in the Forest Plan as noted above. Since alternative 1 does nothing to improve the recruitment of large trees for connectivity and future coarse woody debris in the Riparian Reserve over natural recovery, when added to the effects of the affected environment, the peak flows will continue to increase by between 11 percent and 13 percent for the next 10 years.

Adding the effects of alternative 1 to the affected environment, the cumulative effects on Riparian Reserve function result in slow recovery of large trees; this will result in risk to the channel geomorphology due to bank instability and peak flow increases in the short term until conifer vegetation recovers. There will be lack of coarse woody debris recruitment in the long term and connectivity will be reduced.

Risk to Beneficial Uses

Adding the effects of alternative 1 to the affected environment, the cumulative effect to water quality at the 7th field watershed scale (risk ratio for the USLE model) is increased by less than 0.01 over existing conditions. The future foreseeable actions do not add much to the sediment delivery in the 7th field when compared to the effects from the fire. Cumulatively, Upper and Lower First Creek 7th field watersheds are over the threshold of concern and there will be a nuisance impact to beneficial uses including sediment impacting agriculture

infrastructure and turbidity. These impacts are a short-term nuisance effect to the sediment regime at the watershed scale.

Alternative 2

Direct Effects and Indirect Effects

Alternative 2 includes dead tree removal in about 17 acres of Riparian Reserves along First Creek. Heavy equipment is not permitted within 30 feet of the bank of First Creek, and the edge of Murphy Well and the constructed stock pond but will be used in the outer 120 feet of the Riparian Reserves (see project design features on table 2-1 of chapter 2). Non-hazard fire-killed trees greater than 20 inches in diameter in the Riparian Reserve adjacent to First Creek will be retained as snags and future coarse woody debris. There will be 60 acres of conifer reforestation in Riparian Reserves in alternative 2.

Likelihood of Meeting Desired Condition for Riparian Reserve

Channel Geomorphology

There will be direct impacts to the channel at designated stream crossing if the intermittent channel is crossed with skidding equipment. There are project design features that limit when and where the channel can be crossed (table 2-1 of chapter 2). These limitations along with the rocky character of the stream bed will minimize impacts to the channel geomorphology. The affected areas are likely to be recovered in less than two years.

The availability of woody debris in the Riparian Reserve will be reduced but not eliminated due to dead tree removal. Limitations on removal of trees greater than 20 inches in diameter at breast height will limit impacts to coarse woody debris Recruitment. Conifer reforestation will increase the speed of reforestation in the Riparian Reserves (see the Vegetation section for additional information on vegetation recovery). This will increase the speed of root-strength recovery to promote bank stability and the recruitment of trees that meet the criteria for coarse woody debris in the long term.

Riparian Vegetation

The planting of conifers in the Riparian Reserve adjacent to First Creek will to decrease the time it will take to re-establish a conifer forest in the Riparian Reserve (see Vegetation report). In 20 years, it is expected that the conifers planted will be well established.

Connectivity

The effect of delayed establishment of conifers will be a delay in the recovery of connectivity in the Riparian Reserves. While it will take more than 50 years to establish a forest with closed canopy and trees greater than 20 inches in diameter, the recovery that will occur will improve connectivity.

Peak Flow

The ERA will be increased by as much as 42 acres and as little as three acres of equivalent roaded acres. This translates into about an eight percent increase in peak flows over the current situation as displayed in the affected environment section. The peak flow will stay about eight percent higher than what will occur if no action is taken for about 10 years; then,

the area will begin to recover. The increase in peak flows is not measurable and won't impact the function of the Riparian Reserve in the short or long term.

The existing stream channel geomorphology will remain intact. There will be an increase in the speed of reforestation in the Riparian Reserve which will create conditions where coarse woody debris will be recruited, and connectivity will be improved via increased shade and downed wood. Peak flows will be elevated but not to the point where the riparian function will be compromised or what can be accommodated by existing infrastructure. Alternative 2 is likely to meet desired condition of riparian function for all measures.

Risk to Beneficial Uses

Alternative 2 will contribute between 0.03 and 0.44 cubic yards of sediment to the watersheds per year, for the first 4 years post implementation (see appendix B of the Water Quality resource report, table 8). To put this into perspective a pickup truck bed can hold a cubic yard of material. So the project will produce less than a pickup truck load of sediment from soil erosion. This may cause a small amount of aggregation in any diversion ditches carrying water from the project area and it will create a small amount of turbidity in winter run off stream flows. The risk to beneficial uses is moderate.

Cumulative Effects

Adding the effects of alternative 2 to those represented by the affected environment, the cumulative effect to water quality at the 7th field watershed scale (risk ratio for the USLE model) is increased by less than 0.02 over existing conditions. Cumulatively, Upper and Lower First Creek 7th field watersheds will be over the threshold of concern and there will be a nuisance impact to beneficial uses including sediment impacting agriculture infrastructure and turbidity. These impacts are a short-term nuisance effect to the sediment regime at the watershed scale. The effect of reasonable foreseeable future actions is as discussed for alternative 1. The cumulative risk to beneficial uses from adding the effects of alternative 2 to those of ongoing and reasonable foreseeable future actions is moderate.

Alternative 3

Direct Effects and Indirect Effects

Likelihood of Meeting Desired Condition for Riparian Reserve

The direct and indirect effects of alternative 3 on *channel geomorphology, riparian vegetation and connectivity* are the same as for alternative 1. The effects to peak flow are the same as for alternative 2.

Risk to Beneficial Uses

The effect of alternative 3 on sediment delivery to streams is similar to alternative 2. The difference is the sediment delivery of alternative 3 as estimated by the USLE model is 0.01 cubic yard less than for Upper and Lower First Creek in alternative 2. The overall effect to beneficial uses is the same as for alternative 2.

Cumulative Effects

The cumulative effects for channel geomorphology, riparian vegetation, and connectivity are the same as for alternative 1. The cumulative effects on peak flow and water quality are the same as for alternative 2.

Comparison of Effects

Effects of alternatives on water quality are compared above under the effects of each alternative and in table 2-3 in chapter 2 of this EA.

Compliance with law, regulation, policy, and the Forest Plan

The project complies with the Basin Plan, The Porter Cologne Act, the Total Maximum Daily Load and the Clean Water Act by complying with the conditions of the waiver of timber harvest (Water Board 2010). The project also complies with the Forest Plan standards (see Forest Plan Checklist on the project website).

Air Quality

Methodology

Analysis Indicators and Methodology

Compliance with the General Conformity Rule of the Clean Air Act for nitrogen oxides must be analyzed for this project. The conformity rules apply only to the activities occurring in the federal non-attainment areas and makes exceptions for activities with emissions considered to be less than “*de minimus*” values. The *de minimus* for nitrogen oxide emissions is 100 tons per year. The average emissions of nitrogen oxides are estimated through the use of the First Order Fire Effects Model (FOFEM).

The analysis will include an evaluation of the estimated residence time of smoke from project activities and its impact to the worst days haze to determine compliance with the Regional Haze Rule. Compliance with the Regional Haze Rule requires that states make reasonable progress towards achieving natural visibility conditions in Class I areas. The reasonable progress means that the worst haze days get less hazy *and* that visibility does not deteriorate on the best days, when compared with the baseline period of 2000 to 2004 (California Air Resource Board, 2009). Federal agencies should not prevent this progress through management activities. Methodology is discussed in detail in the Air Quality and Fire and Fuels resource reports, available on the project website.

Spatial and Temporal Context

For this project, the spatial boundary includes the project area, the community of Butte Valley, and the Lava Beds National Park. Temporally, emissions from mobile sources such as logging trucks and tractors, as well as from prescribed burning, are transient and the impacts are short-lived and the air quality regulations are in terms of one-year emissions. The temporal analyses are on an annual basis and considered short-term. Impacts are considered long-term if they persist for more than a year. The cumulative effects of the mobile source emissions, fugitive dust and smoke emission will be addressed on the 7th field watershed scale.

Affected Environment

The project is 25 miles from Lava Beds National Park which is designated as a Class I wilderness by the Clean Air Act. The project area is primarily forested federally managed lands with no substantial human-caused emission sources within the area other than emission and fugitive dust from logging and recreation. Other emission contributions will be smoke and haze from seasonal wildland and prescribed fires from both within and outside the county. According to the California Air Resources Board (<http://www.arb.ca.gov/app/emsinv/emssumcat.php>) the nitrogen oxide emissions are primarily from heavy-duty diesel trucks (such as from the I-5 corridor).

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Under this alternative no management action will be taken that will emit nitrogen oxides, greenhouse gases, or impact the visibility in the Lava Beds National Park.

Cumulative Effects

There are no direct or indirect effects for this alternative and therefore no cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

The First Order Fire Effects Model estimates there will be about 22 pounds per acre of nitrogen oxides emitted during prescribed burning of activity fuels. There is about 270 acres of pile burning related to site preparation of plantations and about 10 acres of piles of slash on landings (assumed about one-half of the landings will have piles to burn). This means the project will not emit more than about 6160 pounds or 3 tons of nitrogen oxide emissions in total. This is less than the *de minimus* of 100 tons per year maximum allowed to meet regulations in the Conformity Rule.

The prescribed fire proposed in the project area will occur over a few days of any given year. Burning will occur in the spring or fall, outside of the wildfire season. Since the wildfire season is the time of the year when haze is at its worse, the project won't impact visibility on the worst haze days. The likelihood that prescribed burning on a few days any given year will affect the average visibility on the best days over an entire year is small. The likelihood of preventing the progress of the Regional Haze Plan is very low for this alternative.

Cumulative Effects

Adding the effects on air quality of alternative 2 to effects of ongoing or reasonably foreseeable future actions in the project area is expected to provide minimal cumulative effects with the oversight of the Siskiyou County Air Pollution Control District. Criteria pollutant and greenhouse gas emissions will degrade air quality cumulatively with activities occurring in the surrounding area. However, these emissions are expected to be minimal and able to disperse readily. Compliance with Burn Day, Marginal Burn Day, and No Burn Day

designation, and coordination with and permitting from the Siskiyou County Air Pollution Control District, will minimize cumulative effects of prescribed fire.

Alternative 3

Direct Effects and Indirect Effects

The effects of alternative 3 are the same as alternative 2 except there are only 10 acres of burning proposed (assuming about one-half of the landings will have burn piles). This reduces the nitrogen oxide emissions to less than 0.1 ton per year. The likelihood of preventing the progress of the Regional Haze Plan will measurably be less than alternative 2.

Cumulative Effects

The cumulative effects are the same as in alternative 2.

Comparison of effects

The comparison of the effects of alternatives on air quality is discussed under the effects of alternatives above and in table 2-3 in chapter 2 in this EA.

Compliance with law, regulation, policy, and the Forest Plan

All alternatives are compliant with the Clean Air Act and the Conformity Rule. The project will not prevent the progress of the State of California's Regional Haze Plan as required by the Regional Haze Rule, and will be consistent with the Forest Plan as displayed on the Forest Plan consistency checklist, available on the project website.

Social and Economic

Methodology

Overview of Methodology

The Region 5 Timber Sale Economic Evaluation model and the Treatments for Restoration Economic Analysis Tool (TREAT) model are being used to analyze the effects of the project on the economics of Siskiyou County. The Region 5 Timber Sale Economic Evaluation model calculates the approximate residual value of the timber sale to the purchaser after completion. The TREAT model calculates approximate present net value, which shows potential employment in number of jobs and the probable income these jobs will provide. These models provide an effective comparison of the economic resources for each project alternatives. All calculations and models are a best estimate and may differ from actual results. Total treatment acres are likely to change before implementation.

Social and civil rights analysis is based on the quality of life of people affected by this project. Quality of life does depend on an economic element, for people to sustain themselves and their families, analyzed in the economic portions of this document. Tables and figures, created using the Economic Profile System – Human Dimensions Toolbox, are used to display the social and economic status of Siskiyou County compared to the State of California and the United States. This software is produced by Headwaters Economics. The Economic Profile System – Human Dimensions Toolbox uses published statistics from federal data sources including the Bureau of Economic Analysis and Bureau of the Census,

U.S. Department of Commerce; Bureau of Labor Statistics, U.S. Department of Labor; and others.

Safety is an analysis indicator that is estimated by the number of acres on which standing dead trees are removed by harvest (for forest workers, firefighters and public users of the Forest) and by the number of miles of roadside hazard trees removed (for forest workers, firefighters and public users of the Forest who drive through the project area). Safety from high intensity wildfires for residents of communities near the project area is also estimated by number of acres and miles of roadside hazards treated in each alternative.

Analysis Indicators

Economic analysis indicators for this section are volume per acre of timber sale units, employment created, potential income to purchaser and employees, and cords of public firewood.

Quality of life of people affected by this project will be the indicator used for the social analysis. Elements of quality of life are lifestyles, values, beliefs, and health. For this project, the primary measure is the effect on the value of using the resources of the Forest and project area for benefit to the county residents (Siskiyou County Land and Resource Management Plan 1994).

Safety of forest workers, firefighters, and public users of the Forest will also be measured in this report. Safety will be measured by burned acres treated and miles of roadside hazard trees removed. Dead trees pose substantial safety hazards to the public as they deteriorate; therefore, a lack of delay in implementation is also used to measure safety.

Spatial and Temporal Context

The borders of Siskiyou County spatially bound both the social and economic analyses for this section. Siskiyou County will be used as the analysis area because both the project area and the closest mill that will take products created from this project are located within the county.

This section considers five years as the time period for effects analysis on social and economic resources. This temporal bounding approximates when all treatments will be completed and products from implementation will have entered the wood products market, and when social effects of the project will be noticeable.

Affected Environment

The closest communities to this project are the towns of Bray and Macdoel. Bray is about eight air miles east of the Little Deer project area, and Macdoel is about 12 air miles north east of the project area. The shortest potential haul routes for this project do not go through these communities.

The Siskiyou County population consists of Caucasian, African American, American Indian, Hispanic, Asian, Native Hawaiian or Pacific Islander, and other races. The American Indian population is greater in percentage when compared to California; therefore, the Forest will pay careful attention to the potential impacts of management actions on the American Indian population.

Siskiyou county demographics are notably different in many categories when compared against California and the United States; 19.6 percent of individuals and 15.7 percent of Siskiyou County families were below the poverty line; this is greater than California. The project will carefully assess the effects on low-income populations in Siskiyou County.

From 1970 to 2011, Siskiyou County's population grew from 33,258 to 44,507 people, a 34 percent increase. During the same time period, employment grew from 14,085 to 20,224 jobs, a 44 percent increase. Personal income consists of labor and non-labor income. Non-labor income includes dividends, interest, rent and transfer payments (payments from governments to individuals). Labor income in Siskiyou County has held relatively constant since 1970. Non-labor income has been on a steady rise since 1970.

Since 1990 the population has been relatively steady, staying around 44,000 people; the annual unemployment rate ranged from a low of 7.5 percent in 2000 to a high of 16.6 percent in 2010. This unemployment rate approximately followed the national trend over the same period, although Siskiyou County unemployment rates trended to be a few percent higher than the rest of the United States.

In 1998, timber represented 7.33 percent of total employment of Siskiyou County. By 2011, timber represented 4.98 percent of total employment. The steady downward trend of timber employment in Siskiyou County mirrors the trend of the whole United States. From 1998 to 2011, growing and harvesting shrank from 214 to 83 jobs, a 61.2 percent decrease, and sawmills shrank from 425 to 259 jobs, a 39.1 percent decrease. During the same period, wood products manufacturing grew from 49 to 68 jobs, a 38.8 percent increase. The sum of these figures shows a total of 688 timber jobs in 1998, and in 2011 a total of 410 jobs, which is a 40 percent decline in timber jobs between 2011 and 1998. "Although National Forests account for more than 60 percent of the county's land base, the share of the county's timber harvest off federal lands has decreased from roughly 50 percent to less than 20 percent since the northern spotted owl was listed as threatened in 1990. Since 1990, the number of wood products manufacturing facilities in the county has declined by half" (Dennis, 2012).

Lifestyles, attitudes, beliefs and values of Siskiyou County residents are similar to those of rural residents in other counties in the western United States. Many local residents depend on the environment to support them, and this in turn affects their lifestyles and attitudes.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Under this alternative no project treatment activities are proposed. The social effects of taking no action will be a continuation of the current distribution of jobs among racial and ethnic groups. The lifestyles, values and beliefs of the people in Siskiyou County will continue on the same trend if no project is proposed. Logging companies support jobs and income, and the timber serves as an important input to production for local mills. Zero cords of firewood will be available in this alternative.

The economic direct and indirect effect of alternative 1 will not contribute to timber employment jobs, which have declined 40 percent from 1998 to 2011 (U.S. Department of Commerce 2013, Census Bureau, County Business Patterns, Washington, D.C.). The

continuation of the county's economic situation is dependent upon a continuous supply of raw material to manufacture products.

The effect on safety of implementing the no action alternative will be that zero burned acres will be treated and zero miles of roadside hazard trees will be removed. This will increase the chance of a forest worker, firefighter, or public user of Forest land being injured by a fire killed or damaged tree as time goes on and the trees deteriorate and fall down. Because no roadside hazard trees will be removed in this alternative, travel on roads within the fire area will be hindered year after year due to new trees falling into the roads. This poses a safety risk to both USFS personnel and public users who drive these roads. Fallen trees in the road may also delay the response of firefighting personnel to new wildland fires in and around the Little Deer area. Safety for Siskiyou County as a whole will decrease slightly as the Little Deer project area only represents 0.135 percent of the Siskiyou County land base.

Cumulative Effects

For cumulative effects analysis purposes, all current and reasonably foreseeable similar actions within Siskiyou County over the next five years were considered. Future foreseeable actions on National Forest System land within Siskiyou County are available on the Forest Service Schedule of Proposed Actions website: <http://www.fs.fed.us/sopa/>. These projects include the Big Pony, Ruff Grouse, Butte Mt., Landlord, Pumice, Six Shooter, and Harlan projects on the Goosenest Ranger District of the Klamath National Forest, the Salmon Salvage, Eagle Springs Hazard, Westside Salvage, Two Bit, Jess, Hotelling Roadside Hazard, Crawford, McCollins LSR, Eastend, Music LSR, Craggy, and Lover's Canyon projects on the westside of the Klamath National Forest, and the Harris project on the McCloud Ranger District of the Shasta Trinity National Forest. A list of planned Timber Harvest Plans for California can be found at:

http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_thpstatus.php/. There are currently 11 Timber Harvest Plans listed for Siskiyou County.

Implementation of alternative 1 will neither support nor add to the demand for timber industry jobs and its related industries employment. Adding the social and economic effects of these projects to the effects of alternative 1 will not result in substantial social or economic cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

Timber volume produced from a timber sale is a quantifiable direct effect from project actions. Volume per acre is a major factor in the economics of a timber sale. The logging costs of stump to truck are much more than the cost of truck to mill. The higher the volume per acre, the more efficient a logging operation is at producing volume for the same amount of fuel and equipment use. Alternative 2, if harvested in 2015, will average about 862 cubic feet per acre in sawlogs and 335 cubic feet per acre in biomass. Alternative 2, if harvested in 2016, will average about 576 cubic feet per acre in biomass.

Alternative 2, if harvested in 2015, shows total gross revenue of \$3,336,337, with a total cost of \$3,146,049, which leaves approximate revenue to the purchaser of \$220,288. Alternative 2, if harvested in 2016, shows total gross revenue of \$649,220, with a total cost of \$822,582,

which leaves an approximate loss of revenue to the purchaser of \$(-173,362). This potential revenue includes a 10 percent profit margin added in.

Alternative 2, if harvested in 2015, will result in approximately 32.8 total annual jobs, with equal distribution of jobs among racial and ethnic groups. Direct employment from the project is 19.8 jobs and 12.9 indirect/induced jobs. This results in a direct labor income of \$541,644, and an indirect/induced labor income of \$681,190, totaling \$1,222,834 annual labor income. Alternative 2, if harvested in 2016, will result in approximately 14.3 total annual jobs, with equal distribution of jobs among racial and ethnic groups. Direct employment from the project is 12 jobs and 2.3 indirect/induced jobs. This results in a direct labor income of \$111,521, and an indirect/induced labor income of \$119,673, totaling \$231,194 annual labor income.

The effect on safety of implementing alternative 2 will be that 1,821 burned acres will have dead trees removed and about 12 miles of roadside hazard trees will be removed. Delaying treatment until 2016 will negatively affect safety during 2015. Safety for Siskiyou County as a whole will increase slightly as the Little Deer project area only represents 0.135 percent of the Siskiyou County land base.

Public firewood cutting may be opened (after timber harvest) within areas analyzed for timber harvest in alternative 2. One 87 acre unit will not be commercially harvested and instead be opened exclusively for public firewood. However, the amount of firewood available will be low for multiple reasons. Ponderosa pine, the main species in the project area, is not a desired species for firewood. Large diameter downed wood will be left as coarse woody debris and large snags will be retained as wildlife habitat. Because firewood will not be available until after harvesting operations are complete (at the earliest this will be fall 2015 or spring 2016) most wood available for firewood will already have some rot in it making it less desirable for firewood cutters. Due to these factors it is estimated that only about 100 cords of firewood will be available.

Contractors and purchasers often use a local work force for logging and hauling. This project will help slow the decline in timber employment in Siskiyou County. The firewood areas in this alternative will contribute to the 4,000-cord yearly demand of surrounding communities from the Goosenest Ranger District. The value of the timber sale portion of the project at advertised rates (if harvested in 2015) is about \$220,232. One quarter of this value may contribute \$55,058 to Siskiyou County as timber receipts. Changes in lifestyles, values, attitudes and beliefs due to implementation of the Little Deer project are likely to be immeasurable due to the small amount of social effects from the project.

Cumulative Effects

For cumulative effects analysis purposes, all current and reasonably foreseeable similar actions within Siskiyou County over the next five years were considered as noted in the cumulative effects of alternative 1. Adding the effects of alternative 2 to the social and economic effects of ongoing and reasonable foreseeable future projects will result in measureable effects but is not likely to result in substantial social or economic cumulative effects.

Alternative 3

Direct Effects and Indirect Effects

Alternative 3, if harvested in 2015, will average about 862 cubic feet per acre in sawlogs and 335 cubic feet per acre in biomass. Alternative 3, if harvested in 2016, will average about 576 cubic feet per acre in biomass.

Alternative 3, if harvested in 2015, shows total gross revenue of \$3,024,596, with a total cost of \$2,835,439, which leaves approximate revenue to the purchaser of \$189,157. Alternative 3, if harvested in 2016, shows total gross revenue of \$583,310, with a total cost of \$747,660, which leaves an approximate loss of revenue to the purchaser of (\$-164,350). This potential revenue includes a 10 percent profit margin added in.

Alternative 3, if harvested in 2015, will result in approximately 30.6 total annual jobs, with equal distribution of jobs among racial and ethnic groups. Direct employment from the project is 18.8 jobs and 11.6 indirect/induced jobs. This results in a direct labor income of \$487,842, and indirect/induced labor income of \$612,796, totaling \$1,100,638 annual labor income. Alternative 3, if harvested in 2016, will result in approximately 13.9 total annual jobs, with equal distribution of jobs among racial and ethnic groups. Direct employment from the project is 11.8 jobs and 2.1 indirect/induced jobs. This results in a direct labor income of \$101,002, and indirect/induced labor income of \$107,827, totaling \$208,829 annual labor income.

The effect on safety of implementing alternative 3 will be that 1,558 burned acres will have dead trees removed and about 12 miles of roadside hazard trees will be removed. Delaying treatment until 2016 will negatively affect safety during 2015. Safety for Siskiyou County as a whole will increase slightly as the Little Deer project area only represents 0.135 percent of the Siskiyou County land base.

Public firewood cutting may be opened (after timber harvest) within areas analyzed for timber harvest in alternative 3. However, the amount of firewood available will be low for multiple reasons. Ponderosa pine, the main species in the project area, is not a desired species for firewood. Large diameter downed wood will be left as coarse woody debris and large snags will be retained as wildlife habitat. Because firewood will not be available until after harvesting operations are complete (at the earliest this will be fall 2015 or spring 2016) most wood available for firewood will already have some rot in it making it less desirable for firewood cutters. Due to these factors it is estimated that only about 50 cords of firewood will be available.

The value of the timber sale portion of the project at advertised rates (if harvested in 2015) is about \$189,111. One quarter of this value may contribute \$47,278 to Siskiyou County as timber receipts. Changes in lifestyles, values, attitudes and beliefs due to implementation of the Little Deer project are likely to be immeasurable due to the small amount of social effects from the project.

Cumulative Effects

For cumulative effects analysis purposes, all current and reasonably foreseeable similar actions within Siskiyou County over the next five years were considered as noted in the cumulative effects of alternative 1. Adding the effects of alternative 3 to the social and economic effects of ongoing and reasonable foreseeable future projects will result in

measurable effects but is not likely to result in substantial social or economic cumulative effects.

Comparison of Effects

Table 3- 18: Comparison of social and economic effects of alternatives

Indicator	Alt. 1	Alt. 2 (2015 Harvest)	Alt. 2 (2016 Harvest)	Alt. 3 (2015 Harvest)	Alt. 3 (2016 Harvest)
Gross Revenue	\$0	\$3,366,337	\$649,220	\$3,024,596	\$583,310
Sawlog Vol./Acre	0 cu. ft./acre	862 cu. ft./acre	0 cu. ft./acre	862 cu. ft./acre	0 cu. ft./acre
Sawlog Volume	0 cu. ft.	1,495,142 cu. ft.	0 cu. ft.	1,343,386 cu. ft.	0 cu. ft.
Biomass Vol./Acre	0 cu. ft./acre	335 cu. ft./acre	576 cu. ft./acre	335 cu. ft./acre	576 cu. ft./acre
Biomass Volume	0 cu. ft.	580,510 cu. ft.	998,784 cu. ft.	521,588 cu. ft.	897,408 cu. ft.
Revenue to Purchaser	\$0	\$220,288	(\$-173,362)	\$189,157	(\$-164,350)
Employment created	0 jobs	32.8 jobs	14.3 jobs	30.5 jobs	13.9 jobs
Labor Income	\$0	\$1,222,834	\$231,194	\$1,100,638	\$208,829
Cords of Firewood	0	100	100	50	50
Acres of Timber Sale Treatment	0	1,734	1,734	1,558	1,558
Safety hazards abated in miles of roadside treatment	0 miles	12 miles	12 miles	12 miles	12 miles
Meets local social value for resource use	No	Yes	Somewhat	Yes	Somewhat

Compliance with law, regulation, policy, and the Forest Plan

Direction and guidance for this document includes the Forest Plan standards (27-1 through 27-9, page 4-67), the accompanying EIS (pages 130-139, and 159-165) and the Siskiyou County Comprehensive Land and Resource Management Plan. Laws that guide this assessment include the National Forest Management Act, the National Environmental Policy Act, USDA Civil Rights Policy, and Executive Order 12898. All federal actions are required to consider the potential of disproportionate effects on minority and low-income populations.

All action alternatives are consistent with the Forest Plan, as noted on the Forest Plan checklist for this project, available on the project website at <http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=45313>. All action alternatives will be consistent with the goals of the Siskiyou County Comprehensive Land and Resource Management Plan and comply with law, policy, and regulation.

Scenery

Methodology

Overview of Methodology

A scenery assessment of project activities was conducted using field and office review, professional expertise, and on-the-ground knowledge. Seven potentially affected sensitivity

viewpoints were identified with visibility of the project area including: Highway 97, Grass Lake Rest Area, Forest Road 70, County Road 6P01 (Tennant Road), Goosenest Mountain, and Herd Peak and Orr Mountain Lookouts.

This analysis applies current National Forest Landscape Management methodology in conjunction with existing Forest Plan direction. It is based on previous field studies of similar types of projects, field observations from sensitive viewpoints, and consideration of public preferences for scenic quality. More detailed information is provided in the body of the Scenery resource report, available on the project website.

Analysis Indicators

Analysis indicators used to determine the effects of alternatives on scenery include:

Scenic Character: the overall visual impression or image that gives a geographical area its identity. Scenic character is a qualitative description of the the combination of vegetative patterns, landforms, water characteristics, and cultural features. The existing scenic character description provides a basis for comparing changes from alternatives.

Scenic Integrity represented by Visual Quality Objectives (VQOs): levels of acceptable visual change identified in the Forest Plan. Integrity may meet or exceed Forest Plan VQOs.

Spatial and Temporal Context

The spatial scale for analysis of effects to scenic character (analysis area) includes the viewsheds within and outside the project area from the sensitive viewing locations identified in the Forest Plan as displayed in table 3-19. For scenic integrity (VQOs), the spatial analysis area is the project area within which management takes place. The temporal scale is defined as up to three years for scenic integrity short-term effects (Retention and Partial Retention VQOs must be met within three years; maximum modification VQO must be met immediately Forest Plan, page 4-35). Short-term effects to scenic character are defined as five years (the time required for dead trees to fall); long-term effects to scenery are up to 80-100 years (time for conifer regeneration to reach maturity; see the Vegetation section of chapter 3 of this document and the Vegetation resource report).

Table 3- 19: Identified potential viewsheds, sensitivity level, and distance zone

Potential Viewpoint(s)	Visual Sensitivity Level	Distance Zone
State Highway 97 (Volcanic Legacy Scenic Byway)	High	Foreground
Grass Lake Rest Area	High	Middle ground
Herd Peak Lookout*	High	Background
Forest Road 70	Moderate	Foreground
County Road #6P01 (Tennant Road)	Moderate	Foreground
Goosenest Mountain*	Moderate	Background
Orr Mountain Lookout*	Moderate	Background

Visual Sensitivity Level: **High** = high level of interest in scenery; **Moderate** = secondary County or Forest road, recreation site or area, moderate use
 * = Viewpoints identified as a sensitive viewpoint post-Forest Plan and as such were not used in the development of Forest Plan VQOs. Post-Forest Plan viewpoints are not required to meet standard 11-1, but can be considered during project planning.
 SOURCE: USDA, Forest Service, Klamath National Forest. 2009. Scenery Sensitivity Levels Map, Klamath National Forest – Eastside (on file at the Klamath National Forest Headquarters, Yreka, CA).

Affected Environment

Scenic Character

The overall scenic character consists of volcanic peaks protruding from broad, gently sloping landforms; previous to the Little Deer fire these were overlain with largely continuous ponderosa pine forest canopies. Attractive openings include small meadows, sagebrush flats, and distinctive irregular lava flow patches on or near the volcanic peaks. The volcanic landforms, lava flow patterns, and consistently high atmospheric clarity are all major attributes of the area's scenic character. The conifer forest canopy was also a major scenery attribute but this has been changed by the Little Deer fire.

The Little Deer fire burned along a five-mile stretch of Highway 97 with high severity effects, especially in ponderosa pine, creating standing dead trees, blackened tree boles and brush skeletons, bare soil, and dying trees with brown needles. The burned area is visible for this five-mile stretch and views into the burned area may reach 500-600 feet from Highway 97 and visible about one mile along Forest road 70 which forms a portion of the northern boundary of the project area. The intersection of the Tennant road and Highway 97 provides limited views into the burn area looking through some green trees which survived the wildfire. Four distant viewpoints outside the project area provide partial views of the project area, including Grass Lake Rest Area, Goosene Mountain, and Orr Mountain and Herd Peak Lookouts.

Scenic Integrity

In the project area, current scenic integrity as viewed from inventoried sensitive viewpoints is as follows: overall the project area has some limited evidence of existing roads, a fence line, and a well. Across the project area as a whole, the alterations are minor, and generally a near-natural appearance dominates. Therefore the project area has Moderate Scenic Integrity and meets a Partial Retention VQO as defined in the Forest Plan.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Alternative 1 will result in direct short and long-term adverse effects to scenic character. In the short term, evidence of the fire with standing dead trees, blackened tree boles and brush, bare soil, and dying trees with brown needles will continue to be noticeable. Along Highway 97, most screening vegetation has lost all needles, thereby opening up views into the forest of bare soils and rock piles. In two to three years, some brushes and grasses will return to the burn areas providing some green color, texture, and ground cover.

By the end of five years, it is expected that pine trees will have decayed to the point where 60 percent of the trees will fall to the ground. As dead trees fall, the scenic character of areas once-forested will change becoming much more open. High fuel loads will create a landscape susceptible to a high intensity, high severity fire. These conditions will likely change the color and texture and will noticeably change the scenic character from a conifer-dominated vegetation type towards a shrub-dominated ecosystem.

Scenic integrity will experience no change because no management actions will affect Visual Quality Objectives.

Cumulative Effects

In the analysis area for scenic character, the California Department of Transportation will remove 90 percent of the trees within approximately 100 feet of Highway 97 on both the west and east sides of the highway. This will change the scenic character along the highway by “opening up” the travel corridor. In the short term, travelers will likely notice the presence of fresh wood chips, ground disturbances, and freshly-cut stumps. In two to three years, these effects will diminish with needle cast, natural regeneration of vegetation, and aging (graying) of the wood chips and stumps.

Several other private land parcels within and adjacent to the project area have been or are proposed for salvage logging. Skid trails on lands recently logged are noticeable from sections of highway 97. On lands proposed for logging, if trees are removed up to and along straight property boundaries, these line contrasts will likely be noticeable from some sensitive viewpoints.

Other ongoing and future foreseeable actions on National Forest lands identified in appendix C of the EA (First Creek, Erickson, and Pomeroy) will generally open up stands by thinning, mowing, and/or under burning. These projects will likely be visible from some sensitive viewpoints but appear near-natural. Adding the effects of alternative 1 to the effects of these ongoing and reasonable foreseeable future actions will not have a substantial effect on scenic character or integrity.

Alternative 2

Direct Effects and Indirect Effects

Scenic Character

The removal of dead and dying trees will create large openings with texture contrasts with adjacent forested areas. Surviving green trees will remain individually as well as in stringers and islands. Individual larger snags and clumps that are retained will provide some texture to the units when viewed from sensitive viewpoints.

The removal of hazard trees throughout treatment units, near landings, and along system roads will have little to no effect to scenic character. The limited number of trees to be removed, and their extended viewing distances from sensitive viewpoints, will keep hazard tree removal from being noticeable. Since no system roads within the project area (except Forest Road 70) are identified sensitivity viewpoints, and no hazard tree removal is anticipated along Forest Road 70, hazard tree removal will not have a measurable effect on scenic character. Any hazard trees removed along Highway 97 (on National Forest lands) will be viewed as part of dead tree removal activities.

Planting of conifers only in areas previously stocked with conifers, combined with rocky sites, sites that are not suitable for planting, and tree survival rates, will provide spatial variability across the project area.

Indirect long-term beneficial effects to scenic character from management treatments will be the accelerated speed of vegetation recovery in the burned area.

Scenic Integrity

Along Forest Road 70, a unit and landing are on top of a hill screened by existing green trees. It is unlikely travelers will notice any activities, thereby meeting a Retention VQO.

At the Tennant Road intersection with Highway 97, travelers will look directly into the project area. The fire burned in this area with low intensity along Highway 97, thus many green trees survived and will provide a visual screen of the units.

To reduce effects to scenic character in the immediate foreground of highway 97, 27 clumps of snags (dead trees) will be retained. These clumps are located to provide some short-term visual screening and/or to minimize visibility of the ground disturbance and stumps immediately adjacent to the highway. These small untreated clumps of dead trees will also show evidence of the fire until the snags decay and fall. Hazard trees proposed for removal off of Highway 97 were excluded and influenced the location, design, and layout of the retained clumps.

Between these clumps there will be occasional stringers with treatment up to highway 97. A project design feature to lower stumps to 6 inches or less (chapter 2, table 2-1 of the EA), combined with aging (graying) of stumps and green vegetation provided by some natural regeneration and replanting, will reduce or eliminate the visibility of management activities in these areas.

Implementation of a project design feature (chapter 2, table 2-1 of the EA) to eliminate the creation of new landings that are visible from Highway 97 and keep any existing landings from being visible from highway 97 after implementation will minimize negative effects on VQO.

At the Grass Lake Rest Area, travelers can see a small portion of the western boundary of the project area at middle ground distance (1½ miles). A retention clump was identified to ensure that dead tree removal will not create a notched effect by daylighting the ridgeline. Therefore, project activities will meet the assigned Partial Retention VQO from this viewpoint.

Portions of the project area will be visible from Herd Peak and Orr Mountain Lookouts and Goosenest Mountain at background distances (greater than 4 miles). Although there will be a textural contrast from dead tree removal, the irregularly-shaped units will appear near-natural and easily meet a Partial Retention VQO.

Minor localized short-term direct adverse effects to VQOs from management treatments will occur during project implementation with the presence of equipment, stumps, exposed soils, and cut and/or piled vegetation. The greenery provided by regeneration of vegetation during the three years after project completion will reduce visual evidence of activities to acceptable levels. All VQOs will be met project wide on about 3,425 acres.

Cumulative Effects

Adding the effects of alternative 2 to the effects of the ongoing and reasonable foreseeable future actions identified in the cumulative effects of alternative 1 will not have a substantial effect on scenic character or integrity.

Alternative 3

Direct Effects and Indirect Effects

Scenic Character

In addition to the scenery effects described in alternative 2, the retention of 30 percent standing dead trees in dead tree removal stands will add some texture to these units when viewed from some sensitive viewing locations. Only one identified no treatment area (718-93) will be visible from Highway 97; some of the others may be visible from distant viewpoints of Orr Mountain and/or Herd Peak Lookouts and Goosenest Mountain. The negligible increase in texture will have no effect on overall scenic character.

Scenic Integrity

The effects on scenic integrity (VQOs) will be the same as for alternative 2.

Cumulative Effects

All scenery effects are the same as Alternative 2.

Comparison of Effects

Scenery effects are displayed by alternative in table 2-3 in chapter 2 of this EA.

Compliance with law, regulation, policy, and the Forest Plan

All alternatives comply with law, regulation, policy related to scenery. Action alternatives will help achieve the desired conditions to perpetuate ecologically established scenery, minimize visible disturbances, and meet VQOs identified in the Forest Plan (see the Forest Plan consistency checklist, available on the project website). Integration of scenery project design features insures this project is consistent with Forest Plan scenery desired conditions.

Recreation

Methodology

An assessment of the effects of Little Deer project activities on recreation was conducted using field and office review, professional expertise, and on-the-ground knowledge.

Analysis Indicators

Analysis indicators used to determine the effects of alternatives on recreation include:

1. Recreation use— increases, decreases or remains the same.
2. Recreation Opportunities—increase, decrease, or remain the same.

Spatial and Temporal Context

The spatial scale for analysis of the effects to recreation is the Little Deer project area because project activities will have direct effect on recreational use and opportunities. The temporal scale defines short-term effects defined as three years or less and long-term effects

of ten years or longer because within this time period there will be visual change of vegetative growth and deer browse value will have.

Affected Environment

Recreational use in the project area is very low and consists of dispersed recreation opportunities. Dispersed recreation opportunities include primitive camping, hunting, woodcutting, viewing scenery. Although no primitive camping sites are located within the project area, five dispersed campsites are located immediately adjacent to northern boundary of the area. There is some all-terrain vehicle (ATV) use in the area, primarily in association with deer hunting.

Woodcutting is a popular recreation activity in the project area; ponderosa pine and cedar burned in the recent fire are readily available for fuelwood cutting. Wood cutters are currently permitted to take ponderosa pine and cedar if they are standing dead or down logs and are allowed to remove them if they are adjacent to Forest roads or laying on the ground. Wood cutters may cut and travel off open National Forest system roads 100 feet to load wood.

Viewing scenery in and of the project area, primarily from roads or viewpoints overlooking the area such as lookouts, is another popular recreation activity. Scenery, and the effect of the project on scenery, is discussed in the scenery section of this document and the Scenery resource report.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Under alternative 1, current management plans will continue to guide management of the project area. There will be no project-related treatments. Overall, recreation use and opportunities will remain unchanged. There will be no direct or indirect effects.

Cumulative Effects

As there are no direct or indirect effects, there are no cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

The operational impacts from the project activities such as traffic, noise, smoke, and dust are short-term adverse impacts to recreationists but will be temporary in nature.

An indirect beneficial effect to recreation will be designated firewood areas totaling 87 acres. This alternative will allow access up to two years after project implementation on a temporary road on an existing road bed and allow cross country travel within stands 719-64, 719-95, and 719-96. This access will cause a short-term increase in recreational firewood cutting within the project area.

Alternative 2 proposes 512 acres of planting and seeding of brush and grasses throughout 1,463 acres outside dead tree removal units and the inter-planting of these species on 490

acres within the reforestation units. This replanting will be an indirect beneficial effect to recreation because there will be a long-term increase in forage for deer populations and use of the area (as described in the Wildlife resource report); thus improving the quality of deer hunting in the project area.

A project design feature blocking access to temporary roads and skid trails upon project completion will prevent unauthorized public travel off system roads.

Meeting or exceeding Visual Quality Objectives (VQOs) for all management areas will protect recreation settings and thus meet Recreation Opportunity Spectrum Classes for all management areas.

Changes in stand structure after project implementation may result in some changes in recreational use patterns but will not impact recreational opportunities. There is no reason to expect recreation use to measurably increase or decrease as a result of this alternative.

Cumulative Effects

Adding the effects of alternative 2 to those of the reasonably foreseeable future actions noted in appendix C will not have a substantial effect on recreation use or opportunities.

Alternative 3

Direct Effects and Indirect Effects

Since there will be no open access designated for firewood in this alternative, woodcutting will be limited to existing woodcutting permit regulations. Current permits allow retrieval of firewood 100 feet off of open Forest system roads; therefore recreational woodcutting is not likely to increase with this alternative.

Alternative 3 proposes the replanting shrubs and native grasses on 399 acres within dead tree removal units; this will have an indirect beneficial effect to recreation by increasing the forage for deer populations and use of the area within these units. Opportunities for harvesting deer will increase in the project area.

Cumulative Effects

Cumulative effects on recreation of adding the effects of alternative 3 to the effects of reasonably foreseeable future actions are the same as for alternative 2.

Comparison of Effects

Recreation effects are displayed by alternative in table 2-3 in chapter 2 of this EA.

Compliance with law, regulation, policy, and the Forest Plan

Action alternatives in this project will help achieve the desired conditions to perpetuate ecologically established scenery, minimize visible disturbances from the Forest Plan (meet Forest Visual Quality Objectives (VQOs)), and maintain existing recreation opportunities. Integration of scenery and recreation project design features insures this project is consistent with Forest Plan standards and moves toward scenery and recreation desired conditions.

Cultural

Analysis Indicators and Methodology

Indicators for effects on historic properties within the Little Deer project area are the number of properties that are at risk from treatments proposed in the project and the degree (level) to which the integrity of historic property values in the Area of Potential Effect (APE) may be diminished by these treatments. Historic properties include archaeological sites and culturally significant areas. Archaeological and historic sites consist predominantly of the physical evidence or cultural debris left on the landscape by past societies. Culturally significant areas may be identified by the presence of physical evidence or debris, and may also consist of plant concentrations, locations for spiritual practices and sacred viewsheds. Both types of properties are identified through background research, field inspections, and tribal consultation. Additional information on these indicators is discussed in the body of the Cultural Resources report.

Approximately 68 percent of the Little Deer project area, or 3,263 acres, have been surveyed for the presence of historic properties and the findings from the completed surveys are documented in 11 survey reports. Approximately 32 percent of the Little Deer project area was not examined because the probability of finding cultural resources in the steep lava flows emanating from southwest flank of Little Deer Mountain is determined to be very low. A total of 15 recorded archaeological sites are located within the Little Deer project area. These sites consist of seven historic railroad logging camps or associated trash deposits; one depression era trash deposit; two post-WWII trash deposits; three trash deposits with cans dating from 1908 through the 1950s, one prehistoric obsidian scatter; and one obsidian workshop area. None of these sites have been evaluated for eligibility to the National Register of Historic Places (NRHP).

Spatial and Temporal Context

Spatial boundaries of the analysis of effects are within the area of potential effect (APE) as defined by the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR Part 800). The area of potential effect for the Little Deer project includes those areas within the Little Deer project area. This area of potential effect was chosen because this is the area that will be affected by project activities. Temporal boundaries for the short-term are based on the effects anticipated to occur during implementation or within one to five years thereafter. Dead and hazard tree removal, vegetative plantings, road maintenance and other disturbances associated with the treatment activities planned for the Little Deer project area will occur during this time frame. Long-term effects will occur after the first five years following implementation. The treatment activities associated with the Little Deer project will have concluded and disturbances from natural processes such as erosion, blow-down, and the mixing of subsurface archaeological deposits from the roots of re-establishing trees, shrubs, and forbs will become the dominant disturbance agent to archaeological sites located in the project area.

Affected Environment

The following is a broad historical overview of the human or cultural mechanisms that have influenced the project area.

Prehistory Period

Archaeological research indicates that Native Americans have occupied the Modoc Plateau for at least the last 10,000 years. Regional studies suggest exploitation of the Butte Valley and surrounding environs for a period of at least 8,000 years, primarily for hunting and gathering. Areas adjacent to permanent water sources and those where two or more ecological zones come together were highly valued. Archaeological sites, features, and artifacts from this period of time are referred to as prehistoric. One archaeological site consisting of an obsidian lithic scatter is located in the Little Deer project area. One multi-component site within the Little Deer project area contains prehistoric and historic-era artifacts.

Ethnographic Period

The project area falls within the overlapping ethnographic territories of the Shasta and the Gumbatwas band of Modoc. However, the project area is primarily within the ancestral territory of the Modoc. The Modoc people's main occupation areas were along the southern shores of Tule Lake in California and along the Lost River in Oregon. The Modoc people practiced a type of seasonal subsistence pattern that followed resources as they became available. The lands now administered by the Goosenest Ranger District were seasonally used for hunting, gathering, and procurement of obsidian for tool-making and trade. Most of the archaeological materials from this period of time are considered prehistoric, although there can be some overlap in this region with historic-era artifacts dating from the late 1700s through the 1830s.

Historic Period

The first known written report of the area comes from Peter Skene Ogden, a Hudson's Bay Company fur trapper who explored the region in 1826-1827. Euro-American settlement began in the late 1850s and early 1860s, which precipitated the Modoc War in 1872-1873. The construction of the mainline railroad from Weed, CA to Klamath Falls, OR, opened up the Goosenest Ranger District for railroad logging in the early part of the twentieth century. The largest logging operations on the District were conducted by the Long-Bell Lumber Company and its predecessor, Weed Lumber Company. Railroad logging began in the Little Deer project area in the early 1910s and continued through 1956, at which time Long-Bell pulled out of the area, removing the ties and rails. Many of the roads in the project area are converted logging railroad grades. Recreation uses such as camping and hunting became common in the Little Deer project area in the 1930s and continue to be popular activities today. Archaeological sites, features, and artifacts from this time period are referred to as historic. 14 of the 15 sites recorded in the Little Deer project area are from the historic-era time period, including an obsidian workshop area that is used as a flint-knapping demonstration location. One of the sites is multi-component and contains artifacts from the historic and prehistoric eras.

Environmental Consequences

The analysis of effects of each alternative is considered based on the proposed management actions and their potential level of impact to cultural and archaeological resources. If an action can alter in any way the characteristics that qualify the resource for inclusion on the National Register of Historic Places, it is considered to have an effect. Effects are "adverse"

when the alterations diminish the integrity of a property's location, design, setting, materials, workmanship, feeling or association. A "no adverse effect" occurs when the project has an effect on the resource but is not harmful to the characteristics that may qualify the resource for inclusion on the National Register of Historic Places. Since no sites have been evaluated for eligibility to the National Register of Historic Places, all sites will be treated as though they are eligible.

Alternative 1

Direct Effects and Indirect Effects

There will be no direct or indirect effects to archaeological sites because no management actions will be implemented in alternative 1.

Cumulative Effects

Since there are no direct or indirect effects, there are no cumulative effects.

Alternative 2 and 3

Direct Effects and Indirect Effects

The treatments, as proposed under alternative 2 and 3, will have no direct or indirect effects on cultural resources because all archaeological and historic sites will be protected using standard protective measures and the project design features ARCH-1 through ARCH-5 in chapter 2 of the EA.

Cumulative Effects

Since there are no direct or indirect effects, there are no cumulative effects.

Comparison of Effects

There are no effects of any alternative on cultural resources.

Compliance with law, regulation, policy, and the Forest Plan

The three alternatives presented in this document comply with all relevant federal and state cultural resource laws and regulations including Section 106 of the NHPA, the American Indian Religious Freedom Act, 36 CFR 800 (Protection of Historic and Cultural Properties), and Executive Order 13007 (Sacred Sites). The project complies with the Forest Plan, as displayed in the Forest Plan consistency checklist, available on the project website.

Federally recognized tribes were contacted early in the project planning in accordance with the Region 5 Programmatic Agreement, National Historic Preservation Act, and other laws and regulations. Other local Native American communities and/or interested parties were consulted as part of the scoping process for this project as disclosed in Chapter 1, Public Involvement. The Klamath Tribes were consulted on the identification of concerns and culturally significant areas or properties in the area of potential effect. No concerns or culturally significant areas were identified. The Forest works in accordance with the Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer and the Advisory Council on Historic Preservation Regarding the

Processes for Compliance with Section 106 of the National Historic Preservation Act for Management of Historic Properties by the National Forests of the Pacific Southwest Region (Regional PA) which specifies the approach for cultural resources protection, including issues such as site identification, interpretation, and protection and stabilization efforts.

Chapter 4 Consultation and Coordination

The Forest Service consulted the following individuals, federal, state, and local agencies, tribes, and non-Forest Service persons during the development of the environmental assessment:

Preparers and Contributors

Table 4- 1: Preparer or contributor by position or role

Position or Role	Name of Preparer or Contributor
Archeologist	Pam Paullin Jeanne Goetz
Botanist and Noxious Weeds	Marla Knight
District Ranger	Laura Allen
Engineer	Jeff Keiser
Fuels Planner	Ron McEwen Kip Van de Water
Geologist and Hydrologist	Angie Bell
GIS Specialist	Sher Marantos
Landscape Architect and Recreation	Bob Talley
Logging Systems	Jamie Kolesar (Team Lead)
NEPA Coordinator and Writer/Editor	Leslie Taylor (Co-Team Lead) Peg Boland
Range Specialist	Kelby Witherspoon
Silviculturist	Mike Reed Dan Blessing
Social Economics	Matt Avery
Soils Scientist	Joe Blanchard
Wildlife Biologist	Debra Freeling Chad Bell

Federal and State Agencies and Tribes

The Forest Service consulted and/or conferred with the following federal and state agencies and tribes during the development of this environmental assessment:

Federal Agencies

- USDI Fish and Wildlife Service

State Agencies

- California Department of Fish and Wildlife
- California Regional Water Quality Control Board, North Coast Region

Tribes

- The Klamath Tribes
- Pit River Tribe

Literature Cited

- Anderson, Hal E., 1982. Aids to determining fuel models for estimating fire behavior. USDA For. Serv. Gen. Tech. Rep. INT-122, 22p. Intermt. For. and Range Exp. Stn., Ogden, Utah 84401.
- Angwin, Peter A. et al. 2012. Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region. Forest Service, Pacific Southwest Region, Forest Health Protection Report #RO-12-01 (April 2012).
- Angwin, Peter A. 2013. Pacific Southwest Experiment Station, personal conversation.
- Bell, A. 2012. Cumulative Watershed Effects Modeling: The Abridged Version. USDA, Klamath National Forest.
- Beschta, R.L. et al. 1995. Wildfire and salvage logging: recommendations for ecologically sound post-fire salvage logging and other post-fire treatments on federal lands in the west. Portland Oregon: Pacific Rivers Council.
- Beschta, R.L., J.J. Rhodes, J.B. Kauffman, R.E. Gresswell, G.W. Minshall, J.R. Karr, D.A. Perry, F.R. Hauer, C.A. Frissell. 2004. Postfire Management on Forested Public Lands of the Western United States. *Conservation Biology* 18:957-967.
- Brown, James K.; Smith, Jane Kapler 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.
- Bryan, Leslie, Bob Rynearson, Shasta County, CA. Afforestation and Fuel Projects. West Coast Regional Carbon Sequestration Partnership Annual Business Meeting, Anchorage, AK. Oct 1-2, 2008.
- Cal Fire Timber Harvesting Plan Status (October 28, 2014). *Cal Fire* [Homepage of California Department of Forestry and Fire Protection], [Online]. Available: http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_thpstatus.php [October 28, 2014]
- California Air Resource Board. 2012. Almanac Emissions Projection Data – 2012 Estimated Annual Average Emissions: Northeast Plateau Air Basin. Retrieved on 16 April 2014. http://www.arb.ca.gov/app/emsmv/2013/emssumcat_query.php?F_YR=2012&F_DIV=-4&F_SEASON=A&SP=2013&F_AREA=AB&F_AB=NEP#8
- California Air Resources Board. 2009. Regional Haze Plan. Retrieved from <http://www.arb.ca.gov/planning/reghaze/rhplan.htm> on 4 April 2014.
- Connaughton, James L. 2005. Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. Council on Environmental Quality.
- Dennis, Nicholas. 2012. The Siskiyou County Forest Sector Model, Final Report. Prepared for the Siskiyou County Board of Supervisors. June 2012.

- Donato, D. C., Fontaine, J. B., Campbell, J. L., Robinson, W. D., Kauffman, J. B., Law, B. E. 2006. Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk. Science Express. Published online 5 January 2006; 10.1126/science.1122855
- Grant, G.E.; Lewis, S.L.; Swanson, F.J.; Cissel, J.H.; McDonnell, J.J. 2008. Effects of forest practices on peak flows and consequent channel response: a state-of-science report for western Oregon and Washington. Gen. Tech. Rep. PNW-GTR-760. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 76 p.
- Gucker, Corey L. 2006. *Cerocarpus ledifolius* In: Fire Effects Information System, USDA, FS, Rocky Mountain Region.
- Hibbs, 2011. Vegetation recovery after fire in the Klamath-Siskiyou Region, Southern Oregon. Oregon State University.
- Hood, S.M., S. L. Smith, and D.R. Cluck. 2007. Delayed conifer tree mortality following fire in California. P. 261-283 in: R.E. Powers, technical editor. 2005. Restoring fire-adapted ecosystems: proceedings of the 2005 national silviculture workshop. USDA FS PNW-GTR-203. Albany, CA.
http://www.fs.fed.us/psw/publications/documents/psw_gtr198/psw
- Karr, J.R., Rhodes, J.J., Minshall, G.W., Hauer, F.R., Beschta, R.L., Frissell, C.A., and D.A. Perry. 2004. The effects of post fire salvage logging on aquatic ecosystems in the American west. Bioscience 54(11) pp.1029-1033.
- LANDFIRE: LANDFIRE National Vegetation Dynamics Models. (2014).[Homepage of the LANDFIRE Project, U.S. Department of Agriculture, Forest Service; U.S.Department of Interior], [Online]. Available: <<http://www.landfire.gov/index.php>> [November 2014]
- Larson, J. Andrew, Churchill, Derek. 2012. Tree spatial patterns in fire frequent forests of western North America, including mechanisms of pattern formation and implications for designing fuel reduction and restoration treatments. Forest Ecology and Management 267 (2012) 74-92.
- Lindenmayer, D. B., Noss, R. F. 2006. Salvage Logging, Ecosystem Processes, and Biodiversity Conservation. Conservation Biology Volume 20, No. 4, 949–958.
- Lowell, E.C., S.A. Willits, and R.L. Krahmer. 1992 Deterioration of fire-killed and fire-damaged timber in the Western United States. Gen Tech. Rep. PNW-GTR-292. Portland, OR: USDA Forest Service, PNW Research Station.
- Marañón-Jiménex, S., Castro, J., Fernádex-Ondono, E. and Zamora, R. Charred Wood Reaming after a Wildlife as a Reservoir of Macro- and Micronutrients in a Mediterranean Pine Forest. International Journal of Wildland Fire. Csiro Published 2013.
- North Coast Regional Water Quality Control Board. 2010. Order No. R1-2010-0029 Waiver of Waste Discharge Requirements for Nonpoint Source Discharges Related to Certain Federal Land Management Activities on National Forest System Lands in the North

- Coast Region.
http://www.waterboards.ca.gov/northcoast/water_issues/programs/timber_operations/timber_waiver/100616/100617_10_0029_Waiver_USFS.pdf
- North Coast Regional Water Quality Control Board. 2011. Water Quality Control Plan for the North Coast Region.
http://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/083105-bp/basin_plan.pdf
- North, Malcolm. Managing Sierra Nevada Forests. PSW-GTR-237. 2012. Chapter 2. Forest Health and Bark Beetles. C.J. Fettig. Chapter 3. Climate Change and the Relevance of Historical Conditions. Safford, North, and Meyer.
- Noss, R. F., Franklin, J. F., William, L. B., Schoennagel, T., and Moyle, P. B. 2006. Ecology and Management of Fire-prone Forests of the Western United States. Society for Conservation Biology Scientific Panel on Fire in Western U.S. Forests. Society for Conservation Biology, North American Section, Arlington, VA.
- Oregon Department of Forestry Log Price Information (October 31, 2014). *Oregon State* [Homepage of Oregon State], [Online]. Available:
http://www.oregon.gov/ODF/Pages/state_forests/timber_sales/logpage.aspx [October 31, 2014]
- Reinhardt, E., Keane, R., Brown, J. (1997) First Order Fire Effects Model: FOFEM 4.0 User's Guide. USDA, US Forest Service. Intermountain Research Station General Technical Report. INT-GTR-344.
- Savage, M. and J.N. Mast., 2005. How resilient are southwestern ponderosa pine forests after crown fires? *Canadian Journal of Forest Research* 35(4): 967-77.
- Scott, J.H., and R.E. Burgan. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 pp.
- Siskiyou County, CA. 1996. Siskiyou County Comprehensive Land and Resource Management Plan. Yreka, CA.
- Siskiyou County, CA. 2005. *The Code of the West: the Realities of Rural Living*. Office of the County Administrator. Yreka, CA.
- Smith, S.L. and D.R. Cluck, 2011. Marking Guidelines for Fire-Injured Trees in California. Forest Service, Region 5, Forest Health Protection Report #RO-11-01 (May 2011).
- Smith, Sydney, 1994, Ecological guide to Eastside Pine Plant Associations, Forest Service Pacific Southwest Region.
- U.S. Department of Commerce 2013, Census Bureau, County Business Patterns, Washington, D.C.

- USDA Forest Service – SOPA – California (October 28, 2014). Homepage of USDA Forest Service, [Online]. Available: <http://www.fs.fed.us/sopa/state-level.php?ca>
- USDA Forest Service 1995. *Forest Plan 2010 Amendment*. Klamath National Forest.
- USDA Forest Service 2005. *Forest Service Manual: Wildlife, Fish, and Sensitive Plant Management*. Washington, D.C.: U.S. Forest Service, 2005. P.8-10 (FSM 2672.42).
- USDA Forest Service 2006. Stipulation and (Proposed) Order RE: Injunction, Case No. C04-844-P. Hon. Marsha J. Pechman. U.S. District Court Western District of Washington at Seattle, October 11, 2006. Unpublished document on file, Supervisor's Office, Klamath National Forest, Yreka, CA.
- USDA Forest Service 2011. Forest Service Manual 2900, Invasive Species Management. USFS. Washington, D.C.
- USDA Forest Service 2013a. 2670: *Federally Listed and Sensitive Plant Species*. July 2013. Klamath National Forest. Yreka, CA.
- USDA Forest Service 2013b. *Klamath National Forest Noxious Weed and Nonnative Invasive Plant List*. March 29, 2013.
- USDA Forest Service 2014a. Direction Regarding the Survey and Manage Standards and Guidelines: Letter to Forest Supervisors within the Northwest Forest Plan Area. May 13, 2014.
- USDA Forest Service 2014b. Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (December 2003, but with January 2001 ROD Category Assignment for Red Tree Vole). May 13, 2014.
- USDA Forest Service 2014c. *Botanical Pre-field Review of Proposed Projects and Results of Preliminary Field Review – Appendix A-1, A-2, A-3*. Little Deer Project. October 22, 2014. Unpublished documents on file. Klamath National Forest, Yreka, CA.
- USDA Forest Service and USDI Bureau of Land Management, January 2001. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents within the Range of the northern spotted owl.
- USDA Forest Service, 2009. Forest Soil Disturbance Monitoring Protocol. Gen. Tech Report WO-82a.
- USDA Forest Service, 2012a. R5 Supplement to FSM 2550- Soil Management. USDA-Forest Service, Pacific SW Region, Vallejo, California.10p.
- USDA Forest Service, Pacific Southwest Region. 1995a (updated through 2010). *Land and resource management plan: Klamath National Forest*. Yreka, CA.
- USDA Forest Service, Pacific Southwest Region. 1995b. Final Environmental Impact Statement for the Land and resource management plan: Klamath National Forest. Yreka, CA.

- USDA Forest Service, Pacific Southwest Region. 1995c. Record of decision for the final environmental impact statement for the Klamath National Forest.
- USDA Forest Service, Pacific Southwest Region. 2013. *Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Management of Historic Properties by the National Forest of the Pacific Southwest Region*. Document on file with Heritage Resources Program: Klamath National Forest Headquarters. Yreka, CA.
- USDA, US Forest Service. 2004. cumulative watershed effects Analysis: Quantitative Models for Surface Erosion, Mass-wasting and ERA/TOC. Prepared by Don Elder and Mark Reichert, Klamath National Forest, Yreka, CA.
- USDA, US Forest Service. 2004. cumulative watershed effects Analysis: Quantitative Models for Surface Erosion, Mass-wasting and ERA/TOC. Prepared by Don Elder and Mark Reichert, Klamath National Forest, Yreka, CA.
- USDI Fish and Wildlife Service 2014. Arcata Field Office. Species List for the Grass Lake and Penoyar Quadrangles, Document numbers 888820687-15534 and 889042207-15713, respectively. October 21, 2014.
- Wood, David L., Thomas W. Koerber, Robert F. Sharpf, and Andrew J. Storer. 2002. Pests of the Native California Conifers. California History Guides.
- Young, James, 1995, Cheatgrass and Wildfires in the Intermountain West, California Exotic pest plant Council, 1995 Symposium Proceeding.
- Zhang, J., J. Webster, R.F. Powers, and J. Mills. 2008. Reforestation after the Fountain Fire in Northern California: An Untold Success Story. *Journal of Forestry* 106:425-430.
- Zlatnik, Elena, 1999 *Purshia tridentate*. In: Fire effects Information System, USDA,FS, Rocky Mountain Region.
- .

Appendix A: Treatment Prescriptions by Alternative

Table A- 1: Treatments by project stand number.

Stand Number	Acres	Alternative 2		Alternative 3	
		Primary Prescriptions	Secondary Prescriptions	Primary Prescriptions	Secondary Prescriptions
718-8-1	109	Site Prep	Conifer Reforestation		Conifer Reforestation
718-8-2	6	Site Prep/Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-8-3	108	Site Prep/Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-8-4	6	Site Prep/Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
718-34-1	142				
718-34-2	18		Plant Shrub/Seed		Plant Shrub/Seed
718-34-3	16	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-34-4	27	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-35-1	42		Plant Shrub/Seed		Plant Shrub/Seed
718-35-2	135	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-35-3	158				
718-35-4	17	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-35-5	11	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
718-35-6	14		Plant Shrub/Seed		Plant Shrub/Seed
718-66-1	10				
718-85	52		Plant Shrub/Seed		Plant Shrub/Seed
718-86	41	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-87	250				
718-88	25		Plant Shrub/Seed		Plant Shrub/Seed
718-89	1	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
718-90	37	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-91	193		Plant Shrub/Seed		Plant Shrub/Seed
718-92	9	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-93	74	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-94	7				
718-95	7		Plant Shrub/Seed		Plant Shrub/Seed
718-96	11		Plant Shrub/Seed		Plant Shrub/Seed

Stand Number	Acres	Alternative 2		Alternative 3	
		Primary Prescriptions	Secondary Prescriptions	Primary Prescriptions	Secondary Prescriptions
718-97	83		Plant Shrub/Seed		Plant Shrub/Seed
718-98	66	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-99	36	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-100	21				
718-101	7	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-102	109	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-103	29		Plant Shrub/Seed		Plant Shrub/Seed
718-104	102		Plant Shrub/Seed		Plant Shrub/Seed
718-105	9	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
718-106	176	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-107	1	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
718-108	12	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
718-109	6	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-110	15	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-111	19		Plant Shrub/Seed		Plant Shrub/Seed
718-112	15	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
718-113	20	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-114	13		Plant Shrub/Seed		Plant Shrub/Seed
718-115	251		Plant Shrub/Seed		Plant Shrub/Seed
718-116	18		Plant Shrub/Seed		Plant Shrub/Seed
718-117	12		Plant Shrub/Seed		Plant Shrub/Seed
718-118	10		Plant Shrub/Seed		Plant Shrub/Seed
718-119	53		Plant Shrub/Seed		Plant Shrub/Seed
718-120	2		Conifer Reforestation /Plant Shrub/Seed		Conifer Reforestation /Plant Shrub/Seed
718-121	3		Plant Shrub/Seed		Plant Shrub/Seed
718-122	2	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
718-123	3		Plant Shrub/Seed		Plant Shrub/Seed
718-124	2	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
718-125	16		Plant Shrub/Seed		Plant Shrub/Seed
718-126	52		Plant Shrub/Seed		Plant Shrub/Seed

Stand Number	Acres	Alternative 2		Alternative 3	
		Primary Prescriptions	Secondary Prescriptions	Primary Prescriptions	Secondary Prescriptions
718-127	1		Conifer Reforestation		Conifer Reforestation
718-128	1		Conifer Reforestation		Conifer Reforestation
718-129	2		Plant Shrub/Seed		Plant Shrub/Seed
718-130	4		Plant Shrub/Seed		Plant Shrub/Seed
718-131	12		Plant Shrub/Seed		Plant Shrub/Seed
719-4-1	18		Plant Shrub/Seed		Plant Shrub/Seed
719-4-2	1	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-4-3	1	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-4-4	15		Plant Shrub/Seed		Plant Shrub/Seed
719-4-5	107	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-4-6	11	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-5-1	14		Plant Shrub/Seed		Plant Shrub/Seed
719-5-2	33	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-6-1	44	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-6-2	15		Plant Shrub/Seed		Plant Shrub/Seed
719-6-3	4		Plant Shrub/Seed		Plant Shrub/Seed
719-6-4	5	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-7-1	2		Conifer Reforestation		Conifer Reforestation
719-7-2	1	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-7-3	18	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-7-4	2		Plant Shrub/Seed		Plant Shrub/Seed
719-8-1	15		Plant Shrub/Seed		Plant Shrub/Seed
719-8-2	22		Plant Shrub/Seed		Plant Shrub/Seed
719-8-3	51	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-8-4	13	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-8-5	7		Plant Shrub/Seed		Plant Shrub/Seed
719-8-6	68	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-8-7	2	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-8-8	1	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-8-9	12		Plant Shrub/Seed		Plant Shrub/Seed
719-8-10	2	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation

Stand Number	Acres	Alternative 2		Alternative 3	
		Primary Prescriptions	Secondary Prescriptions	Primary Prescriptions	Secondary Prescriptions
719-8-11	3	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-8-12	5		Plant Shrub/Seed		Plant Shrub/Seed
719-18-1	31	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-18-2	11	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-18-3	3		Plant Shrub/Seed		Plant Shrub/Seed
719-19-1	34	Dead Tree Removal/Site Prep	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-19-2	2	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-19-3	4	Site Prep	Plant Shrub/Seed		Plant Shrub/Seed
719-19-4	3	Dead Tree Removal/Site Prep	Conifer Reforestation		Conifer Reforestation
719-24-1	129				
719-24-2	3	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-24-3	2	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-24-4	22		Plant Shrub/Seed		Plant Shrub/Seed
719-61	15				
719-62	29	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-63	13	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-64	64	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-65	50		Plant Shrub/Seed		Plant Shrub/Seed
719-66	14		Plant Shrub/Seed		Plant Shrub/Seed
719-67	29	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-68	24		Plant Shrub/Seed		Plant Shrub/Seed
719-69	11	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-70	6		Plant Shrub/Seed		Plant Shrub/Seed
719-71	26		Plant Shrub/Seed		Plant Shrub/Seed
719-72	5		Plant Shrub/Seed		Plant Shrub/Seed
719-73	5		Plant Shrub/Seed		Plant Shrub/Seed
719-74	34	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-75	4	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-76	21		Plant Shrub/Seed		Plant Shrub/Seed
719-77	3		Plant Shrub/Seed		Plant Shrub/Seed
719-78	10		Plant Shrub/Seed		Plant Shrub/Seed

Stand Number	Acres	Alternative 2		Alternative 3	
		Primary Prescriptions	Secondary Prescriptions	Primary Prescriptions	Secondary Prescriptions
719-79	12				
719-80	71	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-81	3		Conifer Reforestation		Conifer Reforestation
719-82	11		Plant Shrub/Seed		Plant Shrub/Seed
719-83	12	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-84	56	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-85	17	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-86	6	Dead Tree Removal	Conifer Reforestation	Dead Tree Removal	Conifer Reforestation
719-87	8	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-88	1	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-89	5	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-90	47				
719-91	28		Plant Shrub/Seed		Plant Shrub/Seed
719-92	18		Plant Shrub/Seed		Plant Shrub/Seed
719-93	22		Plant Shrub/Seed		Plant Shrub/Seed
719-94	5				
719-95	4	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-96	19	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-97	9		Plant Shrub/Seed		Plant Shrub/Seed
732-16-1	17			Dead Tree Removal	
732-27-1	28	Dead Tree Removal	Conifer Reforestation		Conifer Reforestation
719-100	13		Conifer Reforestation		Conifer Reforestation
719-98	2		Conifer Reforestation		Conifer Reforestation
719-99	6		Conifer Reforestation		Conifer Reforestation
719-101	5		Plant Shrub/Seed		Plant Shrub/Seed
719-102	3		Conifer Reforestation		Conifer Reforestation

Appendix B: Vicinity and Alternative Treatment Maps

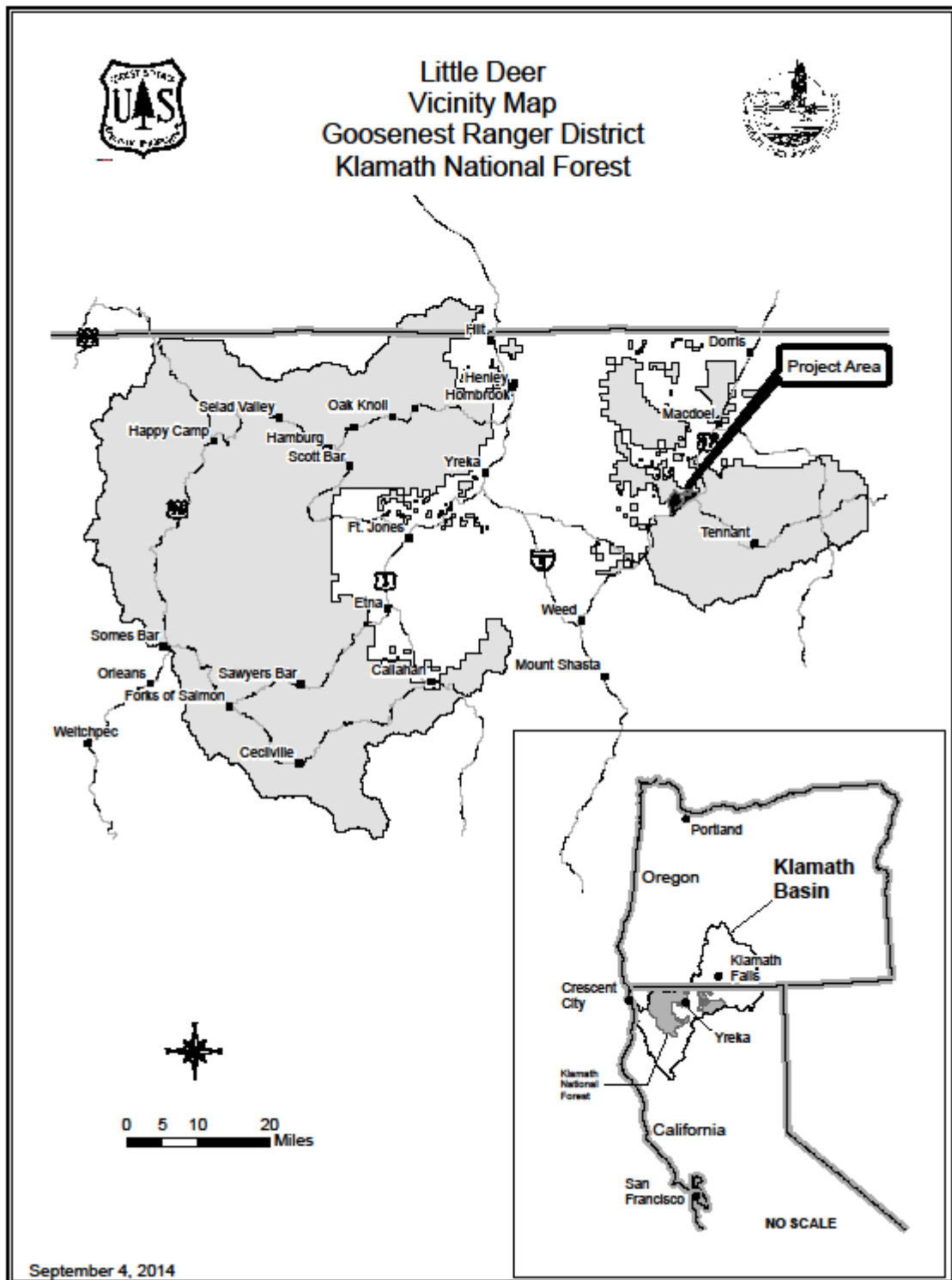
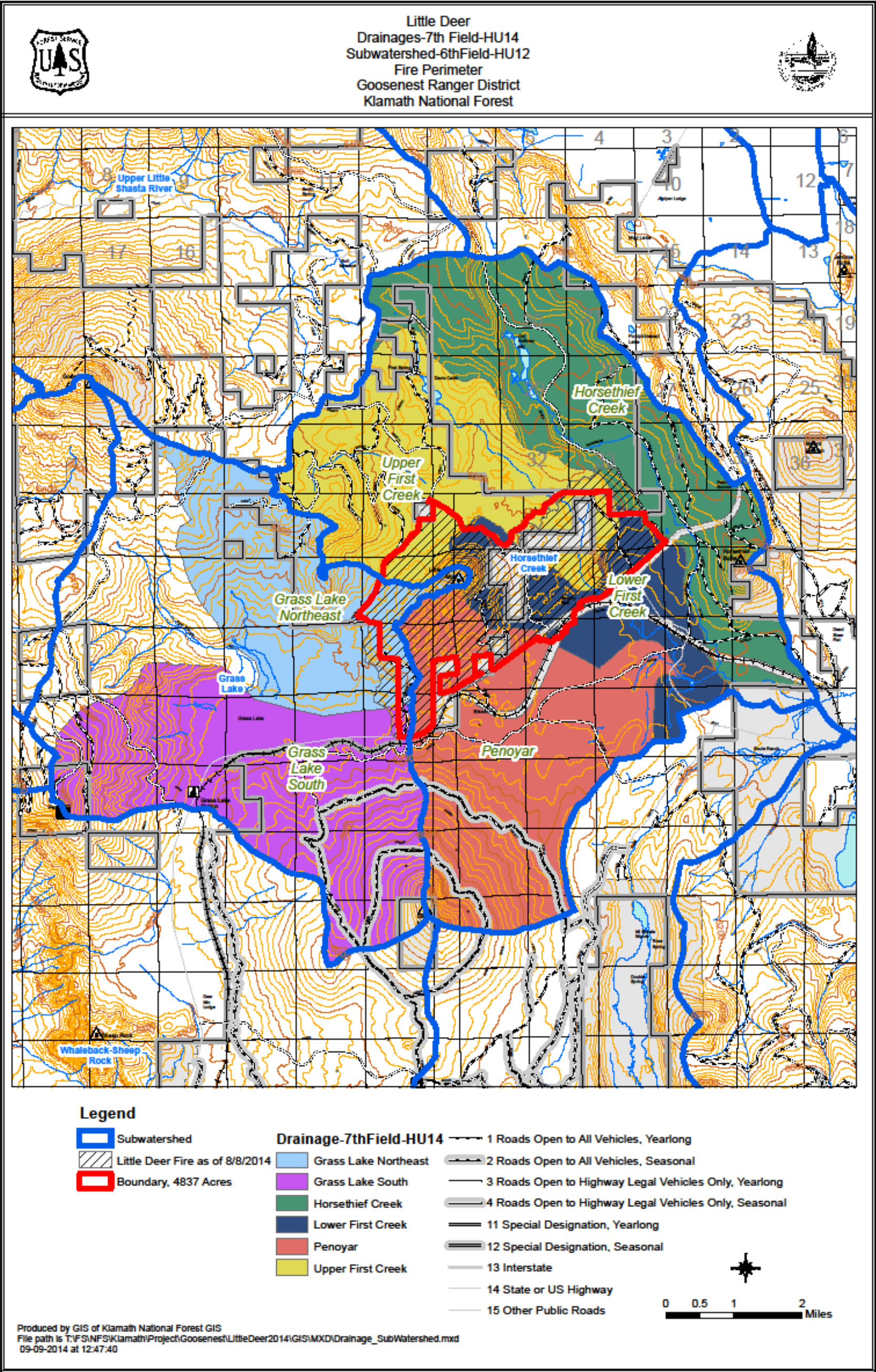


Figure B- 1: Vicinity map of Little Deer Project area.



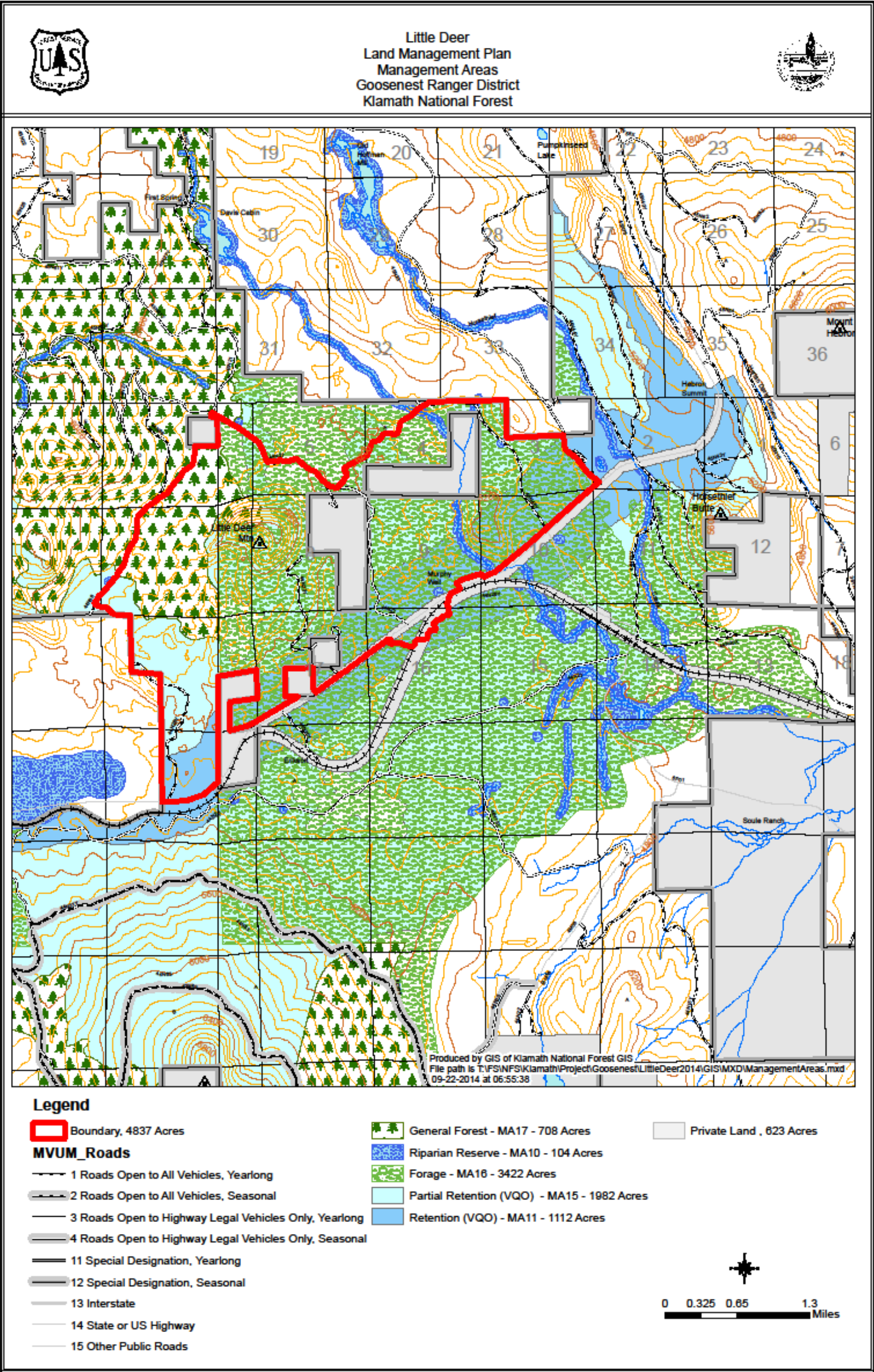


Figure B- 3: Forest Plan forest-wide management area map

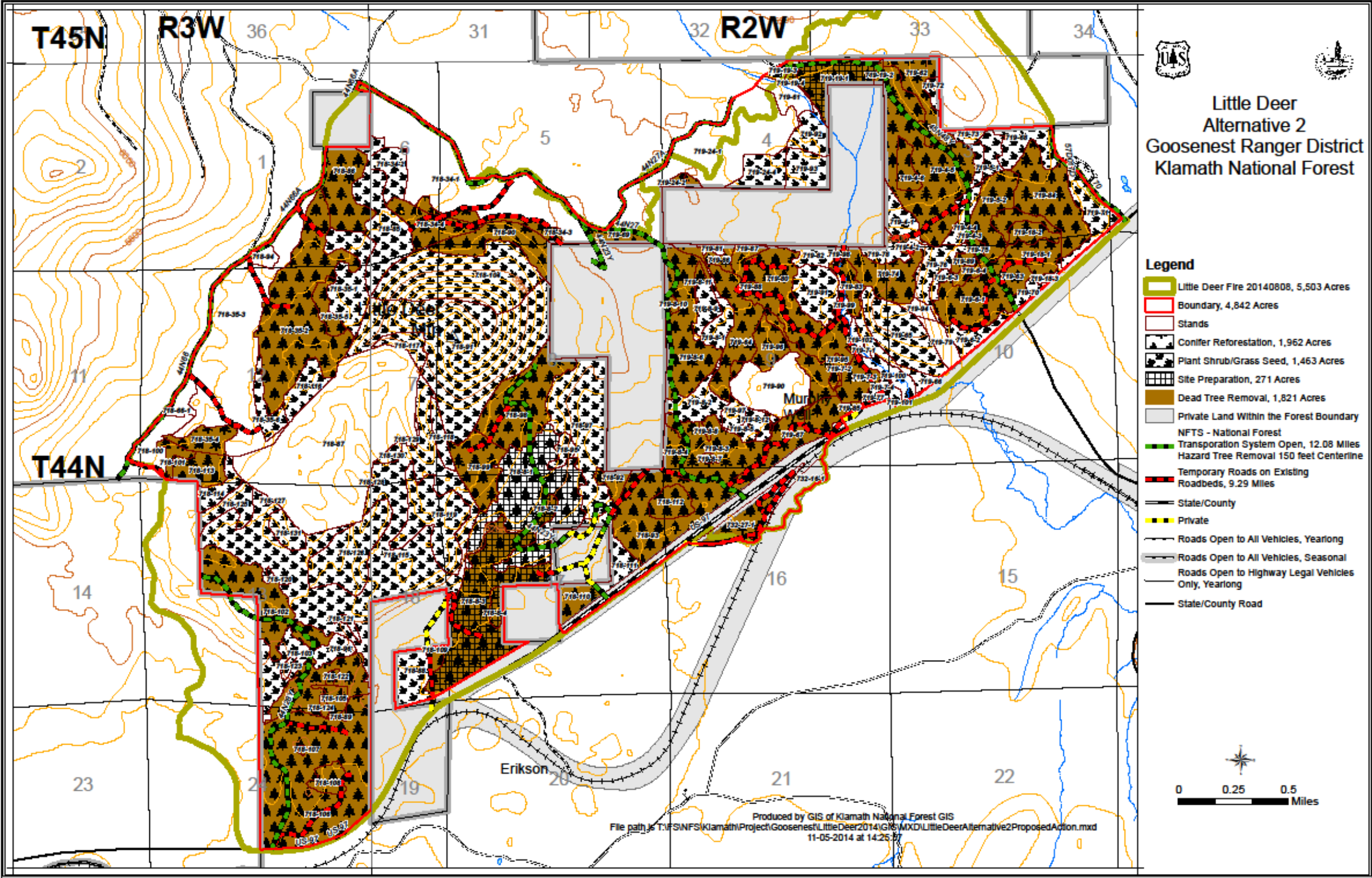


Figure B- 4: Map of alternative 2

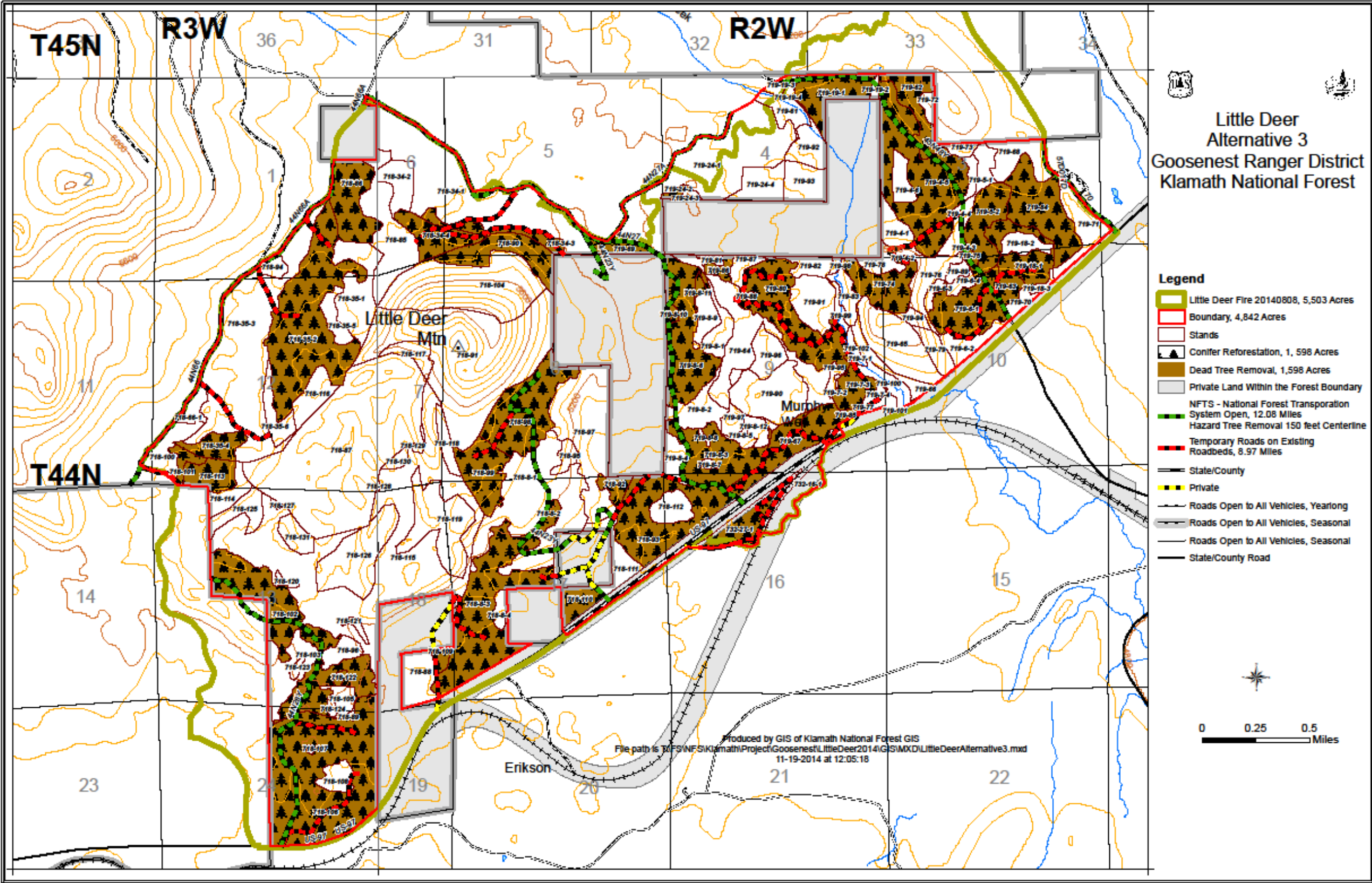


Figure B- 5: Map of alternative 3

Appendix C: Actions Considered for Cumulative Effects

Ongoing and Future Foreseeable Actions

First Creek Forest Health Management Project

This project is located about one mile north of Grass Lake in Siskiyou County. The legal location is within Township 45 North, Range 3 West, Sections 25-27 and 34-36 and Township 44 North, Range 3 West, Sections 1-3 and 11-12, Mount Diablo Meridian. The purpose and need for this project is to 1) Reestablish a healthy forest ecosystem where overcrowded, dying stands exist, 2) Increase forest resilience to pathogens, drought, and wildfire while accelerating development of larger trees in overcrowded stands, 3) Improve forest conditions and terrestrial connectivity in riparian reserves, 4) Increase forest resilience to wildfire, 5.) Provide wood products to the community.

Treatments for this project include: 1) thinning, but retaining the largest trees in the stand regardless of species or condition in all stands; 2) thinning with group selection/improvement with small openings and pine planting; 3) wide thinning with inter-planting of ponderosa pine; 4) thinning and concurrent brush mowing in plantations; 5) prescribed underburning; and 6) mowing of brush in natural stands and plantations. Implementation of these treatments is located in a portion of the Upper First Creek and Grass Lake Northeast 7th field watersheds.

Erickson Vegetation, Fuels, and Road Management Project

The project area is south and east of Grass Lake, about nine miles west/northwest of Tennant, California in Siskiyou County. The legal location is in Township 44 North, Range 3 West, Sections 22-27, 34, and 35; Township 44 North, Range 2 West, Sections 3, 10, 14-17, 19-23, 26-30, and 32- 34; Township 43 North, Range 3 West, Sections 2 and 3; and Township 43 North, Range 2 West, Section 4 Mount Diablo Meridian. The purpose and need for this project is to (1) increase forest resilience to non-endemic forest pathogens, drought, and wildfire while accelerating development of larger trees, (2) improve big game forage quality, and (3) provide wood products to the community.

Treatments for this project include: 1.) thin/chip overcrowded, small diameter ponderosa pine; 2.) thin and improve overcrowded, small diameter ponderosa pine and white fir; 3) reestablish natural openings and aspen by removing encroaching conifers; 4) underburn or pile and burn slash in thinned stands; 5) minimize activity generated fuels by removing tree limbs in the landings; 6) sell or burn landing slash; and 7) reduce lateral fuels by mowing or underburning tall flammable brush. Implementation of these treatments is located in portions of the Lower First Creek and the Penoyar 7th field watersheds.

Pomeroy Project

The project is 12 air-miles northeast of Weed, California in Siskiyou County on the lower slopes of Deer and Whaleback mountains. The legal location is Township 43 North, Range 3 West, Sections 2, 3, 10-16, 22-24; Township 43 North, Range 2 West, Sections 8, 17- 21, 27- 28 Mount Diablo Meridian. The purpose and need for this project is to (1) increase forest resilience to non-endemic forest pathogens, drought, and wildfire, while accelerating development of larger trees, (2) decrease high fire severity stand conditions,

(3) improve the quality of grasses and forbs and browse for big game, and (4) provide wood products to the community.

Treatments for this project include: 1) thinning of overcrowded, eight to 15 inch diameter ponderosa pine and white fir trees; 2) reduce surface and ladder fuels, as well as tree density in the thinning stands, with a combination of thinning trees smaller than eight inches in diameter, by mastication/mowing of brush and/or small trees, and underburning; 3) variations in treatment intensity (mosaic) will retain habitat attributes for flora and fauna that prefer these habitats as well as patches of non-treated areas for those species sensitive to ground disturbance; 4) plantation thinning; 5) mowing and/or mastication of brush for tree release and fuel reduction; and 6) hazardous fuels and ladder fuels (small conifer thinning) treatments. Implementation of these treatments is located in the Grass Lake South 7th field watershed.

Table C- 1: Planned activities by project and fiscal year planned

FISCAL YEAR PLANNED	ACTIVITY	Sum of Acres
(PALS)FIRST CREEK FOREST HEALTH MANAGEMENT PROJECT		3039
2014		1902
	Burning of Piled Material	993
	Precommercial Thin	110
	Site Preparation for Planting - Mechanical	148
	Tree Release and Weed	105
	Underburn - Low Intensity (Majority of Unit)	546
2015		225
	Precommercial Thin	225
2017		911
	Fill-in or Replant Trees	244
	Plant Trees	334
	Site Preparation for Planting - Manual	334
ERICKSON VEGETATION, FUELS, AND ROAD MANAGEMENT PROJECT		850
2015		850
	Tree Release and Weed	791
	Underburn - Low Intensity (Majority of Unit)	58
POMEROY PROJECT		152
2017		4
	Tree Release and Weed	4
2020		7
	Underburn - Low Intensity (Majority of Unit)	7
2021		17
	Precommercial Thin	4
	Yarding - Removal of Fuels by Carrying or Dragging	14
2023		21
	Precommercial Thin	10
	Tree Release and Weed	10
2024		104
	Underburn - Low Intensity (Majority of Unit)	104
Grand Total		4041

Bray and Horsethief Grazing Allotments Project

This project is proposing to authorize grazing on the Bray and Horsethief Allotments. The Little Deer project is located within the Horsethief Allotment, which lies just west of Macdoel in portions of Sections 31 and 32, Township 46 North, Range 2 West; Section 36, Township 46 North, Range 3 West; Sections 1-3, 10-12, 14-15, 22-26, 27, 28, 33-36,

Township 45 North, Range 3 West; Sections 7-9, 16-18, 21, 27, 28, 30, 31, 33-35, Township 45 North, Range 2 West; Sections 1-10, 16-19, Township 44 North, Range 2 West; and Sections 1-4, 10-14, 24, Township 44 North, Range 3 West, Mt. Diablo Meridian. The Horsethief Allotment includes approximately 13,575 acres of Forest lands. The purpose of the proposed action is to authorize grazing on the Bray and Horsethief Allotments under an updated allotment management plan.

Ongoing and Future Foreseeable Actions (Private)

Fruit Growers Supply Company Little Deer Fire Salvage

This area is located approximately 23 miles north of Weed, California by way of state Highway 97. Salvage operations will take place in portions of the following: Township 44 North, Range 2 West; Sections 3, 17, 18, and 19; Township 44 North, Range 3 West; Sections 1, 13, and 24; Township 45 North, Range 2 West; Sections 32 and 33 Mt. Diablo Meridian. The total estimated logging area is 713 acres. Documentation of this salvage project is in the Notice of Emergency Timber Operations #2-14EM-025-SIS (notice of exemption from timber harvest plan requirements). The Registered Professional Forester estimates that more than 90 percent of the conifers within the fire perimeter occurring on Fruit Growers Supply Company property could constitute a significant resource loss if salvage operations were not initiated as soon as feasible.

Fruit Growers Supply Company Grass Lake Salvage Exemption

The Fruit Growers Supply Company is proposing the Grass Lake Salvage project which will remove Christmas trees, dead, dying or diseased, fuelwood or split products under the Notice of Emergency Timber Operations #2-14EX-281-SIS (notice of exemption from timber harvest plan requirements). This salvage is proposed between April 2, 2014 and April 2, 2015. Salvage operations removal will not exceed 10 percent of the volume that existed prior to salvage operations. Within the Grasslake 6th field watershed and the Horsethief creek 6th field watershed this salvage exemption contains 18,073 acres. Of the six 7th field watersheds there are: 3,740 acres in the Grasslake Northeast watershed; 3,992 acres in the Grasslake South watershed; 260 acres in the Penoyar watershed; 14 acres in Lower First creek watershed; 1,612 in the Upper First Creek watershed; and 4,970 in the Main Horsethief Creek watershed.

Individual Private Landowner

Within the Little Deer Project boundary in Township 44 North, Range 2 West, Section 4, a private individual landowner is planning on salvaging dead and dying trees from the Little Deer fire on 230 acres. This piece of property is entirely within the Upper First Creek watershed. No Timber Harvest Plan or Notice of Emergency Timber Operations (notice of exemption from timber harvest plan requirements) has been filed at this time.

Individual Private Landowner

Within the Little Deer Project boundary in Township 44 North, Range 2 West, Section 8, a private individual landowner is planning on salvaging dead and dying trees from the Little Deer fire on 254 acres. This piece of property is entirely within the Lower First Creek watershed. No Timber Harvest Plan or Notice of Emergency Timber Operations (notice of exemption from timber harvest plan requirements) has been filed at this time.

California Department of Transportation Hazard Tree Removal along Highway 97 within Little Deer Fire

California Department of Transportation will remove trees their Foresters have deemed a safety hazard along about 4.25 miles of the California State Highway 97 corridor. They expect 90 percent of the trees to die and be felled within their ownership easement about 100 feet from the centerline of the highway in most areas.

Appendix D: Disposition of Scoping Comments

Method of Scoping Comments Analysis

As a result of scoping, the Forest Service received seven comments from interested and affected parties and agencies (see table D-1). Comment documents were tracked upon receipt to assure all relevant comments were captured. The letters and attachments were logged in and scanned into an electronic file. Individual comments from within each comment document were identified and highlighted. Issues and concerns were placed into a subject category based on the topic. To assist the analysis, the comments were addressed by issue category (see table D-2). Comments that were received prior to scoping were reviewed and considered during development of the proposal, and are not included in this disposition.

Issues are defined as points of discussion, dispute, or debate about the environmental effects of proposed actions.

Comments were categorized as follows:

1. **Relevant Issue.** These issues were defined as concerns about effects that may be directly or indirectly be caused by implementing the proposed action. Relevant issues were resolved through alternative or project design feature development.
2. **Other Issue.** An issue may not be relevant for any of the following reasons:
 - a) The issue is outside the scope of the proposed action, and is not related to the decision to be made.
 - b) The issue is a procedural concern already decided by law, regulation, policy, or direction (Forest Plan).
 - c) The issue is a procedural concern addressed through project design or was/will be addressed through analysis.
 - d) The issue is not supported by scientific (or factual) evidence.
3. **Concern.** These are general comments or questions that do not meet the definition of an issue as stated above.

Results of Scoping Comment Analysis

Table D- 1: Respondent Correspondence and any attachments received

Letter Number	Date Received	Name of Respondent/Affiliation	Attachment Information
1	September 24, 2014	Kelly Conner	N/A
2	September 26, 2014	Richard Svlich American Forest Resource Council	N/A
3	September 29, 2014	Ryan Hadley Sierra Pacific Industries	N/A
4	October 1, 2014	Toby Mills Scott Timber Company	N/A
5	October 2, 2014	Grace Bennett Siskiyou County Board of Supervisors	N/A

Letter Number	Date Received	Name of Respondent/Affiliation	Attachment Information
6	October 6, 2014	George Sexton Klamath Siskiyou Wildlands Center	Scoping period comments received by Klamath Siskiyou Wildlands contained 17 attachments with no project specific comments provided, 47 literatures cited in letter with no attachments provided, and attached 13 cited documents with comments that had project specific comments.
7	October 10, 2014	Donnabelle Boomgarden Shasta Indian Nation	N/A

The following table displays the comment codes used in this analysis of public comments.

Table D- 2: Content analysis categories and comments received in each category

Subject Category	Total Comments by Category
Mailing list	1
Position or No Rationale Provided	5
Cultural Resources	1
Health and Safety	6
Resource Value	12
Proposed New Alternative	2
Multiple Resources	5
Ecosystem and Habitat Health	9
Water Resources	2
Soils	4
Fire and Fire Risk	10
Biological Resources	2
Invasive and Noxious Plant Species	1
Wildlife/Animals	14
Scenery or Visual Resources	2
Timber Resource	27
Transportation System	10

The following table displays the specific comments made by subject code, showing the respondent(s) by letter and comment number, (refer to Table A-1 above). Each comment was categorized as a (1) Relevant Issue, (2) Other Issue, or (3) Concern as defined above.

Table D- 3: Comments from scoping and disposition of comments

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
Mailing List			
#6-54	Other Concern	Contact information for our organizations may be found at the end of this document. Please send us hard copies of all future documents regarding this project	Paper copies will be sent in the future.
Proposed New Alternative			
#6-4	Relevant Issue #1	While we are extremely skeptical of the merits of post-fire salvage logging, we hope that the Little Deer timber sale will include environmental sideboards that alleviate some of our concerns. We request that yarding be implemented over frozen ground or snow. We hope that that transportation access will be limited to existing system and non-system roads. Please consider retention of 30% of standing fire-killed vegetation to assist many snag-associated wildlife species. Please consider replanting conifer species at a low density and irregular distribution. Please ensure that the Forest Service will identify skid trail locations. Please retain 10 snags per acre greater than 10" dbh with a focus on retaining the largest snags in the stand and please include direction to retain all preexisting snags. To the extent possible please limit salvage logging to previously managed stands. Please do not propose logging and yarding activities in Riparian Areas. Please do not authorized commercial salvage logging (and attendant yarding) in Management Area 10 lands. Please limit treatment in these areas to felling, hand piling and burning to help attain the objectives of the Aquatic Conservation Strategy (ACS).	Alternative 3 will be developed to address this issue to the extent practicable. Based on recent past experience, weather may limit the possibility of logging over snow or frozen ground. Final skid trail locations will not be identified until implementation but limitations on where skid trails may and may not occur will be included in Alternative 3 (and in the modified proposed action).
#6-48	Relevant Issue #2	Our organizations hereby propose that the Forest Service include analysis of an alternative based upon all of the post-fire management recommendations contained in the peer reviewed 1995 Bestcha paper provided as an attachment to these scoping comments.	An alternative (A) will be developed to address these recommendations; this alternative will be eliminated from detailed study because some of the recommendations will not meet the purpose and need of this project.
Cultural Resources			
#7-1	Other Issue C	Protect the cultural sites within the burned area	Project design features will be developed and implemented to protect cultural sites.
Health and Safety			
#2-4 #3-3 #4-2	Other Issue C	The roadside hazard should be done only along those roads deemed open for public access. There are only a few miles within this category. These road systems do have a considerable amount of merchantable trees and smaller biomass material.	The purpose of hazard tree removal is to ensure safety for forest workers and the public. Therefore, these treatments are proposed along Forest System roads; most of these roads are open for public access. Harvest and removal of these trees can also help meet other parts of the purpose and need for the project.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
#2-7 #3-6 #4-5	Other Issue C	The only objective for this operation should be for public safety. It is obvious the trees need to be removed for public safety reasons.	The purpose of hazard tree removal is to ensure safety for forest workers and the public.
Scenery or Visual Resources			
#2-20 #3-21	Other Issue C	One of the purpose and need statements deals with the issue of scenery. We believe the focus on scenery should be on restoration of scenic values. The scenery within the project area has been negatively impacted. Most of the public driving along Highway 97 probably doesn't like to look at a sea of dead black sticks. Most travelers would rather see the dead black sticks gone and restoration of a new forested stand take its place. We contend there are currently no scenic values remaining within most of the burn area and treatment through salvage and reforestation, while meeting snag retention, can only benefit the scenic value in the long run.	The current scenic condition of the project area will be described and the effects of all alternatives (include continuing the current situation and taking no action) on scenery will be analyzed and disclosed in the environmental assessment and relevant resource report.
Resource Value			
#1-3	Other Concern	I am also a strong proponent of utilizing the resource by producing wood products while the wood is still marketable. I encourage the Service to aggressively market all potential products from this Project including sawlogs, toplogs, and biomass. The new mill in Yreka takes 4" min diameter logs 16' or longer, and I hope that this product will make it to market.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." Action alternatives will be developed to meet this purpose and need. Diameters of wood to be harvested will follow contract guidelines.
#2-3 #3-2	Other Issue C	The only way to meet the second purpose and need statement is to have NEPA completed quickly with logging commencing this winter/early spring. That is the only way you will capture merchantable volume due to deterioration factors associated with small diameter pine. We can only support your effort as long as the critical timing factor for implementation is met.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects.
#2-10 #3-9 #4-8	Other Issue B	If the Forest is serious about capturing merchantable volume off of this burn, a simple non-complex EA could easily be accomplished by the end of the calendar year.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects.
#2-13 #3-12 #4-11	Other Issue C	It is essential that NEPA be done early enough to allow harvesting to be accomplished this upcoming winter in order to capture merchantable wood from the larger trees.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
			offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects.
#2-21 #3-22	Other Issue C	We are hopeful the District/Forest will place a priority in getting this material removed as quickly as possible. Due to the lack of resource concerns we see no reason why NEPA can't be completed quickly and be done in a timeframe to allow for harvesting this winter. But as stated previously, time is of the essence. Also, by getting this non-complex fire area out of the way you then will be able to focus your attention to those fires that are more complex.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. The Forest and District have put a priority on completing this analysis and disclosure in a timely manner.
#2-22	Other Issue C	The key objective for this project is the rapid vegetative restoration of the burned area and the ability to capture wood products (including sawtimber) in a timely manner. We believe the majority of the taxpayers and county residents would rather see a quick response to the restoration efforts on this fire by producing an economically feasible project that will produce some revenue. That is far better than dragging your feet and then having to spend taxpayer's dollars to accomplish the same outcome.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need and other parts of the purpose and need while following requirements of environmental analysis of effects. The Forest and District have put a priority on completing this analysis and disclosure in a timely manner.
#5-2	Other Issue C	To accomplish this work as economically as possible and to provide much-needed economic activity in Siskiyou County, it is imperative that review and approval of this project proceed on a timely basis in order to ensure implementation during the normal operating season in 2015 while the salvage wood is still marketable.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. The Forest and District have put a priority on completing this analysis and disclosure in a timely manner.
Transportation System			
#2-19 #3-20 #4-18	Other Issue C	It is important an adequate road system be developed and utilized in order to effectively and efficiently harvest the timber from this project. While decommissioning unneeded roads is understandable and supportable we also ask that serious consideration be made for including temporary road	The purpose and need of this project does not include the decommissioning of system roads. Temporary roads on existing road beds (prisms) are proposed to effectively treat the

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		construction that will assist with the implementation of this project. We encourage the building of temporary spurs where feasible to reduce the harvest costs and more effectively treat the land base. This is especially true where existing road prisms already exist.	area and avoid long skids; these temporary roads will be closed (decommissioned) after they are no longer needed to implement the project.
#2-24 #3-18 #4-16	Other Issue C	The proposed action has identified some temporary road construction. We are very aware there will be undue pressure put on the decision maker to not develop any temporary roads for this project. We take the opposite view point.	Temporary roads on existing road beds (prisms) are proposed to effectively treat the area.
#2-25 #4-17	Other Issue C	Temporary roads can allow for more effective and efficient management of the public's land. They can provide for better economics and in many cases reduce environmental impacts as compared to alternative treatments such as long skids.	Temporary roads on existing road beds (prisms) are proposed to effectively treat the area and avoid the environmental impacts of long skids.
#3-19	Other Issue C	They can provide for better economics and in many cases reduce environmental impacts as compared to alternative treatments such as long skids.	Temporary roads on existing road beds (prisms) are proposed to effectively treat the area and avoid the environmental impacts of long skids.
#6-51	Other Issue A	Decommission roads and restore their hydrologic function, particularly in or near Riparian Reserves, on steep slopes, and where roads are not needed to support fire management or private access. Many federal logging roads within the project area should be decommissioned.	The purpose and need of this project does not include the decommissioning of system roads. Temporary roads on existing road beds (prisms) are proposed to effectively treat the area and avoid long skids; these temporary roads will be closed (decommissioned) after they are no longer needed to implement the project. The soils and hydrology sections of the environmental assessment and the relevant resource reports disclose the effects of temporary roads.
Wildlife/Animals			
#2-6 #3-5 #4-4	Other Issue C	There does not appear to be any resource issues or constraints along any of the road systems. Most of the material is completely dead. There should be no threatened or endangered species issues as there is no habitat. There are no water related issues.	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on federally-listed threatened, endangered or proposed species and on water.
#6-22	Other Issue C	Siegel et al. (2011) concluded that native fire-following shrubs are vitally important to biodiversity in complex early seral forest (CESF) created by high-intensity fire: "Many more species occur at high burn severity sites starting several years post-fire, however, and these include the majority of ground and shrub nesters as well as many cavity nesters. Secondary cavity nesters, such as swallows, bluebirds, and wrens, are particularly associated with severe burns, but only after nest cavities have been	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species which includes woodpeckers. Information from available relevant literature will be considered.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		created, presumably by the pioneering cavity-excavating species such as the Black-backed Woodpecker. Consequently, fires that create preferred conditions for Black-backed Woodpeckers in the early post-fire years will likely result in increased nesting sites for secondary cavity nesters in successive years."	
#6-23	Other Issue C	Similarly, Burnett et al. have found that shrub dominated landscapes are critically important wildlife habitat: "while some snag associated species (e.g. black-backed woodpecker) decline five or six years after a fire [and move on to find more recent fire areas], [species] associated with understory plant communities take [the woodpeckers'] place resulting in similar avian diversity three and eleven years after fire (e.g. Moonlight and Storrie)." (Burnett et al. 2012). Burnett et al. (2012) also noted that "there is a five year lag before dense shrub habitats form that maximize densities of species such as Fox Sparrow, Dusky Flycatcher, and MacGillivray's Warbler. These species have shown substantial increases in abundance in the Moonlight fire each year since 2009 but shrub nesting species are still more abundant in the eleven year post-burn Storrie fire. This suggests early successional shrub habitats in burned areas provide high quality habitat for shrub dependent species well beyond a decade after fire." (Burnett et al. 2012).	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species which includes woodpeckers. Information from available relevant literature will be considered. The project area does not provide habitat for shrub-associated species such as those mentioned in the comment.
#6-36	Other Issue C	Scientists have recently recommended that forest managers should ensure the maintenance of moderate and high severity fire patches to maintain populations of numerous native bird species positively associated with fire (Hutto 1995, Hutto 2006, Kotliar et al. 2002, Noss et al. 2006, Smucker et al. 2005). At the landscape level, high severity habitat (unlogged) is among the most underrepresented, and rarest, of forest habitat types (Noss et al. 2006). Indeed, the current annual spatial extent of wildland fire in California's forests is about one tenth of what it was prior to fire suppression (Medler 2006).	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species which includes woodpeckers. Information from available relevant literature will be considered. The project area does not provide habitat for other associations of bird species.
#6-38	Other Issue C	As a result, avian species richness and diversity increases in heavily burned patches occurring within a mix of low and moderate severity effects. Woodpeckers excavate nest cavities in snags and feed upon bark beetle and wood-boring beetle larvae in dead trees; Mountain Bluebirds (<i>Sialia currucoides</i>) and other secondary cavity-nesting species use nest holes created the previous year by woodpeckers; granivores such as the Red Crossbill (<i>Loxia curvirostra</i>) feed upon seed release from cones following fire; shrub dwelling species like the Blue Grouse (<i>Dendragapus obscurus</i>) nest and forage within shrub growth scattered throughout high severity patches; while aerial insectivores such as the Olive-sided Flycatcher (<i>Contopus cooperi</i>) prey upon the bark beetles that are abundant in snag patches (Altman and Sallabanks 2000, Hutto 1995). The	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species which includes woodpeckers. Effects on prey species for the snag association of species are disclosed. The project area does not provide habitat for other associations of species such as those mentioned in the comment; species such as the olive-sided flycatcher are not species at risk for the Forest or District. Effects

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		Olive-sided Flycatcher is listed by the U.S. Forest Service as a Species at Risk, meaning that there is significant concern about the viability of its populations due to habitat scarcity and loss (USFS 2001). Populations of small mammals experience overall increases shortly after high severity fire, and amphibians are positively associated with the large woody material that gradually accumulates in the decades following such fire effects (Smith 2000). As well, ungulates forage upon post-fire flora, and large predators frequently seek their prey in burned patches (Smith 2000).	on ungulates are disclosed in the environmental assessment: in the Wildlife Biological Assessment/Biological Evaluation for deer and elk; in the Rangeland resource report for effects on cattle. Effects on federally-listed mammals (threatened gray wolf and proposed Pacific fisher) and Forest Service sensitive mammals (American marten and California wolverine) are also disclosed in the environmental assessment and supporting Wildlife Biological Assessment/Biological Evaluation. Information from available relevant literature will be considered in the effects analysis.
#6-39	Other Issue C	Studies have detected higher overall avian species richness in severely burned versus unburned forest in the western United States (Bock and Lynch 1970, Hutto 1995, Raphael and White 1984, Siegel and Wilkerson 2005). In one snag forest area resulting from the Manter Fire of 2000 in the southern Sierra Nevada, a total of 111 bird species were observed (Siegel and Wilkerson 2005). Following the 60,000 ha McNally Fire of 2002 in Sequoia National Forest, Olive-sided Flycatchers were found in the burn area (Siegel and Wilkerson 2005). This species had previously been considered to be extirpated from Sequoia National Forest, possibly since 1930 (Altman and Sallabanks 2000).	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species (avian species), federally-listed threatened species and migratory birds. These effects are disclosed in the environmental assessment and supporting Wildlife Biological Assessment/Biological Evaluation. Information from available relevant literature will be considered in the effects analysis. Habitat for species such as the olive-sided flycatcher is not present in the project area.
#6-40	Other Issue C	Research has also indicated that numerous avian species, including several woodpecker species, exhibit a preference for burned conifer forest habitat (Bock and Lynch 1970, Dixon and Saab 2000, Murphy and Lehnhausen 1998, Granholm 1982, Hutto 1995, Saab et al. 2002, Saab et al. 2004). Fire-killed trees provide nesting and foraging habitat for numerous woodpecker species (Hutto 1995, Dixon and Saab 2000). Post-fire logging has been described as a threat to such species (Dixon and Saab 2000, Kotliar et al. 2002, Lindenmayer et al. 2004, Murphy and Lehnhausen 1998, Saab et al 2004).	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species (avian species), federally-listed threatened species and migratory birds. These effects are disclosed in the environmental assessment and supporting Wildlife Biological Assessment/Biological Evaluation. Information from available relevant literature will be considered in the effects analysis.
#6-41	Other	To conserve populations of species which prefer heavily burned forest	Effects on resources will be analyzed and

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
	Issue C	patches in the eastern Cascades, Altman (2000) recommended that: at least 2% of the forested landscape be maintained in early post-fire habitat; at least 40-50% of such burned stands be retained in an unlogged state; and, where salvage logging does occur, all snags (fire killed trees) > 51 cm (20 inches) dbh and half of all snags 30-51 cm (12-20 inches) dbh should be retained.	disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species (avian species), federally-listed threatened species and migratory birds. These effects are disclosed in the environmental assessment and supporting Wildlife Biological Assessment/Biological Evaluation. Information from available relevant literature will be considered in the effects analysis.
#6-42	Other Issue C	There is perhaps no vertebrate species more strongly representative of the snag forest habitat type than the Black-backed Woodpecker (<i>Picoides arcticus</i>) (Hanson 2007, Hutto 1995). This species is a designated Management Indicator Species, acting as a bellwether for the viability of dozens of other species associated with snag forests (USDA 2004). One of only two woodpecker species globally with three toes instead of four, the Blackbacked Woodpecker is able to deliver exceptionally hard blows due to added heel mobility resulting from the lack of a fourth toe and, as a consequence, it can reach beetle larvae that other woodpecker species cannot (Dixon and Saab 2000). One bird eats an astounding 13,500 beetle larvae per year (Hutto, unpublished data). From behind, the all black coloring of this species confers excellent camouflage against the charred bark of a fire-killed tree. Though Black-backed Woodpeckers are occasionally, but rarely, seen outside of stand-replacement burns, forests outside of snag forest habitat are believed to be "sink" habitats which do not support them (Hutto 1995, Dixon and Saab 2000).	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species which includes the black-backed woodpecker. These effects are disclosed in the environmental assessment and supporting Wildlife Biological Assessment/Biological Evaluation. Information from available relevant literature will be considered in the effects analysis.
#6-43	Other Issue C	In the northern Rocky Mountains, the Black-backed Woodpecker is largely restricted to recently severely burned conifer forest that is unlogged (Hutto 1995). The same is true in forests of the Sierra Nevada and southern Cascades (Hanson 2007). The Black-backed Woodpecker, which was historically "quite numerous" in Sierra Nevada mixed conifer forests (Cooper 1870), but later became "rare" (Dawson 1923, Grinnell and Storer 1924, Siegel and DeSante 1999), appears to require a minimum high severity patch size of 12-25 ha (Saab et al. 2002). "Strong excavators" such as the Blackbacked Woodpecker may effectively use snag forest habitat for only 5-7 years post-fire (Saab et al. 2004), relying upon a constantly replenished supply of this ephemeral habitat as new fires occur. However, large fires allow longer periods of occupancy, since it takes nest predators longer to recolonize the burn area (Saab et al. 2004). Other strong excavators, such as the Hairy Woodpecker (<i>Picoides villosus</i>) and	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species which includes the black-backed woodpecker. These effects are disclosed in the environmental assessment and supporting Wildlife Biological Assessment/Biological Evaluation. Information from available relevant literature will be considered in the effects analysis..

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		the White-headed Woodpecker (<i>Picoides albolarvatus</i>) are positively associated with burned forest as well (Saab et al. 2002, Saab et al. 2004).	
#6-44	Other Issue C	Heterogeneous fires are very important ecologically, since a number of species depend not only upon burned forest habitat in general, but also specifically upon particular levels of severity, with some requiring low or moderate severity burn patches and some requiring only patches of high severity burned forest (Smucker et al. 2005, Kotliar et al. 2007). Indeed, a recent scientific study of the northern Sierra Nevada and southern Cascades by the Forest Service scientists concluded that: "...it is clear from the scientific data that burned forest, including stand replacing burns [high severity fire patches], provide important bird habitat. The abundance and diversity of woodpecker species generally reaches a peak in recently burned forest. The Black-backed Woodpecker, a rare resident of the northern Sierra forest, predominantly occurs in recently burned forest. Olive-sided Flycatcher, a species declining throughout the Sierra Nevada, has been shown to be strongly associated with burned forest as well. Thus we promote the view that burned forest is important wildlife habitat." (USFS 2006)	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on the snag association or assemblage of management indicator species which includes the black-backed woodpecker. These effects are disclosed in the environmental assessment and supporting Wildlife Biological Assessment/Biological Evaluation. Information from available relevant literature will be considered in the effects analysis..
#6-45	Other Issue C	It is the diversity of fire effects that facilitates and maximizes native biodiversity (Connell 1978, Noss et al. 2006). It is, in fact, the unlogged high severity patches that are most in deficit in west coast forests, probably more than any other single forest habitat type. Any post-fire logging would only un-do the benefits of heterogeneous fire effects.	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on biodiversity. These effects are disclosed in the environmental assessment and supporting Vegetation resource report and Wildlife Biological Assessment/Biological Evaluation. Information from available relevant literature will be considered in the effects analysis..
Timber Resource			
#2-11 #3-10 #4-9	Other Issue C	There are many areas that will not be proposed to be harvested, rock piles, partially burned areas, steep terrain, etc. You need to identify those acres that will not be harvested to show that hundreds, if not thousands, of dead trees will remain within the project area.	Acres that will and will not be proposed for harvest in action alternatives will be displayed on the maps that are part of the environmental assessment.
#2-12 #3-11 #4-10	Other Issue C	Highlight the percentage of acreage treated vs. not treated.	Acres that will and will not be proposed for harvest in action alternatives will be displayed on the maps that are part of the environmental assessment.
#2-15 #3-14 #4-13	Other Issue C	Do not identify any type of diameter limit for leave trees. There are more trees, greater than 18 inches, within the project area than what is required for snag retention guidelines.	Snag retention guidelines for each area within the project will be specified in the description of each action alternative. Leave trees will be marked to meet project objectives.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
#2-16 #3-15 #4-14	Other Issue C	You would be best to leave your snag retention trees in groups. Leaving several dead trees in groups allows for more intensive treatment for several acres around the groups. Trees left in the non-treated areas can also be counted towards meeting your snag retention guidelines.	Snag retention guidelines for each area within the project will be specified in the description of each action alternative. Leave trees will be identified in clumps to meet Forest Plan standards and marked to meet project objectives.
#2-17 #3-16 #4-15	Other Issue C	Snag preparation could be accomplished very easily. Target the areas with complete dead for your treatment. That was a majority of the burn area anyhow. Flag those areas left as snag retention areas and mark green trees to be left (there are very few of those). The remainder could then be designated by description.	Snag retention guidelines and prescriptions for each area and treatment within the project will be specified in the description of each action alternative. Leave trees will be marked to meet project objectives.
#2-23	Other Concern	We are more than happy to assist in making this restoration effort a successful venture. Feel free to call on any of the industry members with questions concerning logging feasibility, merchantability specs, biomass opportunities, markets, etc.	We appreciate the offer of assistance by the industry.
#2-5 #3-4 #4-3	Other Issue C	All the road systems can be ground based harvested very easily. Don't forget the hazard trees along Hwy 97 that are not within the state right-of-way.	Hazard trees along Highway 97 and outside the State right-of-way are proposed for removal in the proposed action.
#2-8 #3-7 #4-6	Other Issue C	The entire project could easily be done by Designation by Description/Defect and snag preparation would be minimal with just a handful of leave trees needing to be designated.	Prescriptions for each area and treatment within the project will be specified in the description of each action alternative. Leave trees will be marked to meet project objectives.
#6-24	Other Issue C	The great majority of areas that burn at high severity naturally regenerate conifers vigorously--starting shortly after the fire. See Shatford et al. (2007) in Journal of Forestry on this.	The effects of alternatives, including no treatment, on the effectiveness of natural conifer regeneration will be analyzed and disclosed in the environmental assessment and supporting Vegetation resource report.
#6-3	Other Issue C	Our organizations generally oppose post-fire salvage logging of public lands. We believe that the preponderance of peer-reviewed studies regarding the impacts of post-fire logging indicate that such logging often inhibits natural forest recovery, increases fire hazard and decreases wildlife habitat and biodiversity. Hence we consistently urge the Klamath National Forest (and other land management agencies) to focus their vegetation management program on thinning small-diameter ground and ladder fuels in fire suppressed stands to increase forest resiliency and decrease fire hazard. We believe such an approach results in fewer ecological impacts, more predictable timber volume, and less social controversy, than does post-fire salvage logging.	Information from available relevant literature will be considered in the effects analysis in the environmental assessment and supporting resource reports.
#6-49	Other Issue C	How many green (living) trees will be logged to facilitate yarding activities? How many green (living) trees will be logged under the assumption that they will die in the future? Please account for the following findings in your	Information from available relevant literature will be considered in the effects analysis in the environmental assessment and supporting

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		NEPA analysis: "Our key findings on post-fire management are as follows. First, post-burn landscapes have substantial capacity for natural recovery. Re-establishment of forest following stand replacement fire occurs at widely varying rates; this allows ecologically critical, early successional habitat to persist for various periods of time. Second, post-fire (salvage) logging does not contribute to ecological recovery; rather, it negatively affects recovery processes, with the intensity of impacts depending upon the nature of the logging activity (Lindenmayer et al. 2004). Post-fire logging in naturally disturbed forest landscapes generally has no direct ecological benefits and many potential negative impacts (Beschta et al. 2004; Donato et al. 2006; Lindenmayer and Noss 2006). Trees that survive fire for even a short time are critical as seed sources and as habitat that sustains biodiversity both above- and belowground. Dead wood, including large snags and logs, rivals live trees in ecological importance. Removal of structural legacies, both living and dead, is inconsistent with scientific understanding of natural disturbance regimes and short- and long-term regeneration processes. Third, in forests subjected to severe fire and post-fire logging, streams and other aquatic ecosystems will take longer to return to historical conditions or may switch to a different (and often less desirable) state altogether (Karr et al. 2004). Following a severe fire, the biggest impacts on aquatic ecosystems are often excessive sedimentation, caused by runoff from roads, which may continue for years. Fourth, post-fire seeding of non-native plants is often ineffective at reducing soil erosion and generally damages natural ecological values, for example by reducing tree regeneration and the recovery of native plant cover and biodiversity (Beyers 2004). Non-native plants typically compete with native species, reducing both native plant diversity and cover (Keeley et al. 2006). Fifth, the ecological importance of biological legacies and of uncommon, structurally complex early-successional stands argues against actions to achieve rapid and complete reforestation. Re-establishing fully stocked stands on sites characterized by low severity fire may actually increase the severity of fire because of fuel loadings outside the historical range of variability. Finally, species dependent on habitat conditions created by high severity fire, with abundant standing dead trees, require substantial areas to be protected from post-fire logging (Hutto 1995)." - Noss and others, Frontiers in Ecology & Environment (2006:485-86)	resource reports. Information will be provided in the environmental assessment and supporting resource reports on the definitions of green (living) tree and dead or dying tree that will be used in the analysis.
#7-2	Other Concern	take the timber as quickly as you can	
Invasive, Noxious Plant Species			
#6-33	Other Issue C	The forthcoming NEPA document must adequately disclose and analyze the potential for proposed USFS activities to increase and hasten the	The environmental assessment and supporting Botany and Non-native Invasive Species

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		spread of noxious weeds in the planning area. The Butte Falls Resource Area of the Medford BLM plainly acknowledged that noxious weeds are a serious issue for post-fire logging when it wrote the Timbered Rock Salvage Logging DEIS (Butte Falls RA). That DEIS recognized that "[P]rojects in these [action] alternatives could spread noxious weeds at a higher rate than the No Action Alternative, due to a higher level of ground-disturbing activities." (DEIS 3-150). The Timbered Rock DEIS further acknowledged that the higher the burn severity the more vulnerable to noxious weed invasion and that subsequent loss of native vegetation "may be irretrievable." (DEIS 3-151) Such analysis must be completed for the Little Deer salvage logging proposal.	resource report will analyze and disclose the effects of all alternatives, including no action, on the introduction and spread of noxious weeds.
Ecosystem, Habitat Health			
#2-14 #3-13 #4-12	Other Issue B	Leave the minimum required for snag retention within the treated areas. These trees will not be standing for more than 5-7 years after the fire anyhow.	Snag retention guidelines and prescriptions for each area and treatment within the project will be specified in the description of each action alternative. Likelihood of snags of various vegetation types persisting will be discussed.
#6-19	Other Issue C	The Forest Service may be proposing activities to facilitate the artificial planting of trees, and associated elimination of shrubs around planted sites in the fire area, assuming that natural conifer regeneration would not effectively or adequately occur in the absence of such artificial planting. On August 1, 2006, a letter from nearly 600 American scientists opposed post-fire snag removal and subsequent artificial replanting, finding that such activities do not represent the current state of scientific knowledge and "would actually slow the natural recovery of forests and of streams and the creatures within them..." The scientists concluded that "no substantive evidence supports the idea that fire-adapted forests might be improved by logging after a fire." (see August 1, 2006 scientist sign-on letter submitted with these scoping comments). Patches of higher-intensity fire, wherein most or all trees are killed, do not "remove" the stand of trees, and do not put the area to a nonforest use. On the contrary, higher intensity fire patches create one of the most ecologically important and biodiverse forest habitat types in western U.S. conifer forests: "snag forest habitat".	The environmental assessment and supporting Vegetation resource report will analyze and disclose the effects of all alternatives, including no action, on conifer regeneration effectiveness and success. Information from available relevant literature will be considered.
#6-20	Other Issue C	The Forest Service's apparent assumption that higher-intensity fire areas will not naturally regenerate with conifers effectively is not supported by any citation to scientific literature, and is directly contradicted by Forest Service data regarding natural post-fire conifer regeneration in large high-intensity fire patches (Collins et al. 2010). Specifically, the Forest Service found vigorous natural post-fire forest regeneration, dominated mostly by pines and oaks for trees over 1 centimeter in diameter at breast height (Collins et al. 2010, Table 5), and hundreds of trees per acre overall, within	The environmental assessment and supporting Vegetation resource report will analyze and disclose the effects of all alternatives, including no action, on conifer regeneration effectiveness and success. Information from available relevant literature will be considered.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		several years to about a decade after high-intensity fire, even where native shrub cover was 90- 100% (Collins et al. 2010, Tables 5 and 6). This is consistent with findings from other studies (Shatford et al. 2007). And, while a more recent report from Collins et al. (Plumas Lassen Study 2011 Annual Report) claims to find little natural conifer regeneration in many high-severity fire areas this is misleading in light of the fact that nearly half of the area surveyed had been subjected to intensive post-fire logging, which damages soils and removes or destroys natural seed sources-and many of the areas that were not post-fire salvage logged were pre-fire clearcut.	
#6-21	Other Issue C	Further, the results of Collins et al. (2010 [Table 5]), who found and reported substantial natural conifer regeneration-especially ponderosa pine and sugar pine-in high intensity fire patches, excluded salvage logged areas, unlike Collins et al. (2011). Collins et al. (2010) state that "some areas within each of these fires experienced post-fire management, ranging from post fire salvage logging, tree release and weed management. These areas were removed from analysis." (emphasis added). Specifically, Collins et al. 19 (2010 [Table 5]) found 158 ponderosa pine and sugar pine conifers per acre regenerating in high-intensity fire patches in the Storrie fire-68% of the total natural conifer regeneration by species. Moreover, the plots in Collins et al. (2011 [see map]) within the Storrie fire area were concentrated at the edge of the fire in the areas subjected to extensive salvage logging and roadside hazard tree logging, which removes conifer (including pine) seed sources and tramples natural conifer regeneration with ground based machinery (thus, even the plots that technically had not been post-fire logged were often adjacent to logged areas). Extensive natural conifer regeneration surveys deeper into the Storrie fire, at seven years post-fire, revealed abundant natural conifer regeneration, especially pine (Hanson 2007b [Tables 1 through 4, and Appendix A]). In addition, over 95% of the conifer regeneration in Collins et al. (2010, 2011) was under 0.1 cm in diameter at breast height (Collins et al. 2010); the plots used to determine the density of conifers of this size covered only 9 square meters of area per plot, and many high-intensity fire patches in the study only had 3-5 plots for an entire high-intensity fire patch (Collins et al. 2011). This means that, even if 200-300 naturally-regenerating conifers per hectare actually existed in a given high-intensity fire patch, the methods used by Collins et al. would be very unlikely to detect conifers, as a matter of basic math and probability.	The environmental assessment and supporting Vegetation resource report will analyze and disclose the effects of all alternatives, including no action, on conifer regeneration effectiveness and success. Information from available relevant literature will be considered.
#6-34	Other Issue B and C	The following linked research article found CWD mass to be "much higher in wildfire regenerated stands than in stands intensively managed for timber production" (also citing Spies and Cline 1988).	The environmental assessment and supporting Vegetation and Soil resource reports will analyze and disclose the effects of all

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		<p>http://www.fs.fed.us/psw/publications/documents/gtr-181/047_Wright.pdf</p> <p>The value of CWD to fisheries is without question. Areas with stand-replacing fire regimes also have higher CWD than areas with mixed-severity fire regimes, but the role of increasing elevation and decreasing decomposition probably complicate this. References on the value of fire for nutrient cycling should also be addressed. The effect on macroinvertebrates is both an effect and an assay tool. Demographic effects can be detrimental, neutral or positive, but almost always involve shifts in the species mix. The amount of what is NOT known and lack of research is huge as summarized by a 2006 publication at: http://www.frames.gov/rcs/ttrs/19000/19900.html The lack of knowledge and scientific certainty speaks directly to the agency's duty to complete an EIS.</p>	<p>alternatives, including no action, on coarse woody debris and nutrient cycling. Information from available relevant literature will be considered. Results from the environmental assessment will be used to determine the need for an EIS.</p>
#6-37	Other Issue C	<p>Forests experiencing high severity burns, or "snag forests", are often incorrectly assumed by land managers to be "damaged" (USDA 2004). Ecologically, this is strongly contradicted by the scientific evidence. Peak biodiversity levels of higher plants and vertebrates are found in patches of snag forest habitat-areas where most or all of the trees are killed by fire (Noss et al. 2006), consistent with the principle that pyrodiversity enhances biodiversity, where mixed-severity fire effects occur (Chang 1996). Fire-induced heterogeneity, including a mix of low, moderate, and high severity patches, leads to higher post-fire understory plant species richness compared to homogeneous low severity fire effects (Chang 1996, Rocca 2004). Mixed-severity fire, meaning a heterogeneous mix of high, moderate, and low severity effects, facilitates reproduction of numerous native herbaceous and shrub species (Chang 1996, Rocca 2004), the germination of many of which is triggered by fire-induced heat, charate, or smoke (Biswell 1974, Chang 1996). These flowering plants, in turn, increase biodiversity of flying insects, including ymenopterans (bees, wasps, flying ants). And, fire-mediated conifer mortality attracts bark beetles and wood-boring beetles, some species of which have evolved infrared receptors capable of detecting burned forests from over 161 km away (Altman and Sallabanks 2000, Hutto 1995). Other insect species are attracted by the smoke from fires (Smith 2000).</p>	<p>The environmental assessment and supporting Vegetation, Fuels, Botany and Wildlife resource reports will analyze and disclose the effects of all alternatives, including no action, on forest and fire ecology. Information from available relevant literature will be considered.</p>
#6-53	Other Issue B	<p>Please note that there is almost universal agreement that salvage logging does not leave watersheds and forests in a healthier, more resilient state, and that the timber volume gained via salvage is neither predictable nor sustainable. We urge the Forest Service to familiarize itself with the growing body of literature indicating that the post-fire ecosystems have more to offer than simply an opportunity for salvage logging and plantation forestry.</p>	<p>The environmental assessment and supporting Vegetation, Fuels, Botany and Hydrology resource reports will analyze and disclose the effects of all alternatives, including no action, on forest ecosystems. Information from available relevant literature will be considered.</p>

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
Biological Resources			
#6-35	Other Issue C	The forthcoming NEPA document must fully analyze and disclose the ability of the timber sale units to provide the required habitat for snag-dependent species. This analysis must be conducted on an acre-by-acre basis rather than "masked" by relying on snags outside of harvest units to alter the post-harvest per-acre snag numbers.	The environmental assessment and supporting Vegetation and Biology resource reports will analyze and disclose the effects of all alternatives, including no action, on snag-associated management indicator species. The analysis will consider snags per acre on each stand or unit as well as overall for the project area. Information from available relevant literature will be considered.
#6-46	Other Issue C	NATURAL DISTURBANCE CREATES HABITAT AND BIODIVERSITY WHILE LOGGING HARMS FOREST HEALTH The ecological differences between biologically rich stands that result from natural disturbance and stands that are subject to logging and yarding are well-known and established: Early-successional forest ecosystems that develop after stand-replacing or partial disturbances are diverse in species, processes, and structure. Post-disturbance ecosystems are also often rich in biological legacies, including surviving organisms and organically derived structures such as woody debris. These legacies and post-disturbance plant communities provide resources that attract and sustain high species diversity, including numerous early-successional obligates, such as certain woodpeckers and anthropods. Early succession is the only period when tree canopies do not dominate the forest site, and so this stage can be characterized by high productivity of plant species (including herbs and shrubs), complex food webs, large nutrient fluxes, and high structural and spatial complexity. Different disturbances contrast markedly in terms of biological legacies, and this will influence the resultant physical and biological conditions, thus affecting successional pathways. Management activities, such as post-disturbance logging and dense tree planting, can reduce the richness within and the duration of early-successional ecosystems. Where maintenance of biodiversity is an objective, the importance and value of these natural early successional ecosystems are underappreciated. -Swanson et al, The Forgotten Stage of Forest Succession: Early-Successional Ecosystems on Forest Sites. 2010. Frontiers in Ecology and the Environment. 29	The environmental assessment and supporting Vegetation, Fuels, Botany and Wildlife resource reports will analyze and disclose the effects of all alternatives, including no action, on forest and fire ecology. Information from available relevant literature will be considered.
Fire or Fire Risk			
#1-1	Other Concern	As a concerned citizen I applaud the Klamath National Forest for proactively seeking to restore the area burned in the Little Deer Fire. To me it is very important to respond to landscape-level ecosystem restoration needs such as this, and I consider it a crime not to. It seems like such a waste to allow damaged areas to go untreated and actually serve as fuel	The environmental assessment and supporting Vegetation, Fuels, Botany and Wildlife resource reports will analyze and disclose the effects of all alternatives, including no action, on project-level forest and fire ecology.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		for the return fire cycle.	
#6-10	Other Issue C	Please note that the artificial plantations established by the Forest Service following the Hog Fire Salvage in this planning area tended to burn at stand replacing intensity in the 2013 arson fire event. In summary, post-fire logging to facilitate plantation establishment will reinforce a growing tendency toward high severity fire at a landscape scale. Please address peer reviewed findings indicating that post-fire logging and plantation establishment irreversibly hinder the natural low- and mixed-severity fire regime.	The environmental assessment and supporting Vegetation, Fuels, Botany and Wildlife resource reports will analyze and disclose the effects of all alternatives, including no action, on forest and fire ecology. Information from available relevant literature will be considered. The Little Deer project is in response to a 2014 lightning-caused fire; planting is part of the proposed treatment but traditional plantation establishment is not.
#6-11	Other Issue B and C	The Forest Service must use the best available science regarding the effects of fire or the proposed logging on fire and fuels, and document those conclusions in an EIS.	Information from available relevant literature regarding proposed treatments on fire and fuels will be considered in the environmental assessment. The results of the environmental assessment will be used to evaluate the need for an EIS.
#6-12	Other Issue C	Salvage logging would increase fire hazard In the project area, where post-fire fuel loading is currently low, logging without timely slash treatment is likely to be the single most important factor that will contribute to an increase in potential wildfire severity (Weatherspoon 1996). There is no scientific, empirical evidence to prove that the presence of large-diameter standing or downed fuels translates into high fire hazard. Besechta et al.(1995) stated, "We are aware of no evidence supporting the contention that leaving large dead woody material significantly increases the probability of reburn" (p. 11). The Besechta Report prompted responses by agency scientists. These included Everett(1995): "There is no support in the scientific literature that the probability of reburn is greater in post-fire tree retention areas than in salvage logged sites...The authors are correct that the intense reburn concept is not reported in the literature" (p. 4). The Forest Service's Pacific Northwest Research Station reviewed the scientific literature and concurred that, "Following Besechta and others (1995) and Everett (1995), we found no studies documenting a reduction in fire intensity in a stand that had previously burned and then been logged" (McIver and Starr 2000).	The environmental assessment and supporting Fuels resource report will analyze and disclose the effects of all alternatives, including no action, on fuel loading and the likelihood and severity of future wildfires. Information from available relevant literature will be considered.
#6-13	Other Issue C	Small diameter surface fuels are the primary carriers of fire. Current fire spread models such as the BEHAVE program do not consider fuels greater than three inches (3") in diameter because the fine sized surface fuels allow fires to spread. Commercial logging operations often remove large diameter fuels, which have higher surface area to volume (S/V) ratios that inhibit combustion. Moreover, logging leaves behind increased fire	The environmental assessment and supporting Fuels resource report will analyze and disclose the effects of all alternatives, including no action, on fuel loading and the severity of future wildfires. Methodology and models providing information are displayed in both

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		prone slash and other small diameter fuels. Indeed, it is highly likely that a significant amount small diameter material will be the outcome of your salvage logging proposal.	documents. Whole tree logging will be used in action alternatives to substantially reduce slash and small diameter activity fuels.
#6-14	Other Issue C	Logging would create an immediate source of highly flammable fuel. The forthcoming NEPA document must disclose how many tons of slash would remain per acre and how its presence might influence the multitude of lightning strikes that occur in the watershed regularly.	The environmental assessment and supporting Fuels resource report will analyze and disclose the effects of all alternatives, including no action, on fuel loading in tons per acre and the severity of future wildfires.
#6-15	Other Issue C	This issue is highly significant because other federal land agencies have acknowledged in NEPA documents that fine woody material up to three inches in diameter, such as the tops of trees, has the greatest influence on the rate of spread and flame length of a fire, which has direct impacts on fire suppression efforts (e.g., USDI 2002, USDA 1994). Salvage logging could increase fuel loadings by 10 tons to the acre or more. With this immediate change in the project area's fuel model, higher rates of fire spread and greater flame lengths would occur (Rothermel 1991). Direct attack of a fire would be limited under some weather conditions so indirect measures would become necessary. This, in turn, would increase the size and cost of a wildfire. Slash created by logging operations, if not treated, would also increase the duration and intensity of a ground fire.	The environmental assessment and supporting Fuels resource report will analyze and disclose the effects of all alternatives, including no action, on fuel loading, predicted flame lengths and rates of spread of future wildfires. Whole tree logging will be used in action alternatives to substantially reduce slash and small diameter activity fuels.
#6-47	Other Issue B and C	Attached to these scoping comments (attachment 26) is a 2013 letter to congress signed by 250 scientists asking that decision makers "consider what the science is telling us: that post-fire habitats created by fire, including patches of severe fire, are ecological treasures rather than ecological catastrophes, and that post-fire logging does far more harm than good to the nations public lands." While our organizations recognize that science does not always influence Forest Service decision making, perhaps it can guide the agency to acknowledge the necessity to complete an EIS prior to harming the project area and to drop the rhetoric of recovery when describing its economically driven salvage logging desires.	The environmental assessment and supporting resource reports will analyze and disclose the effects of all alternatives, including no action, on meeting all parts of the purpose and need of the project. The results of the environmental assessment will be used to evaluate the need for an EIS. Information from available relevant literature will be considered.
#6-8	Other Issue C	Our organizations are extremely concerned that the post-fire establishment of artificial plantations may increase future fire hazard in the planning area. The practice of planting young tree plantations significantly increases fire hazard in the mid- to long-term. Tree plantations are more susceptible to intense fire behavior and severe fire effects than unlogged mature forests, including burned forests (DellaSala et al. 1995, Odion et al. 2004). The increased susceptibility of plantations to severe fire is due to: - Structural characteristics, such as fine and interlocking branch structures situated low to the ground, which facilitate high heat energy output by fire and rapid fire spread (Sapsis and Brandow 1997). - Warm, windy and dry microclimates compared to what would exist in an unlogged burned forest that possessed	The environmental assessment and supporting Vegetation, Fuels, Botany and Wildlife resource reports will analyze and disclose the effects of all alternatives, including no action, on project-specific forest and fire ecology. Information from available relevant literature will be considered. Planting is part of the proposed treatment but traditional plantation establishment is not.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		more structural diversity, ground shading and barriers to lateral wind movement (Countryman 1955, van Wagtendonk 1996). - Accumulations of large volumes of fine logging slash on the ground surface (Weatherspoon and Skinner 1995).	
#6-9	Other Issue C	In addition to these direct and indirect effects on the fire environment, the cumulative effects of plantation establishment include the creation of more highly flammable even aged stands on a landscape already vulnerable to uncharacteristically large and severe fires. The number and distribution of even-age tree plantations resulting from industrial timber management has altered fire behavior and effects at both stand and landscape scales in the Siskiyou National Forest and Grants Pass Resource Area (Frost and Sweeny 2000, Hann et al. 1997, Huff et al. 1995). Perry (1995) suggests that the existence of sufficient young tree patches on a forest landscape creates the potential for "a self-reinforcing cycle of catastrophic fires." Most plantations occur near roads (DellaSala and Frost 2001), which presents an added risk of human-caused ignitions during hot and dry conditions (USDA 2000).	The environmental assessment and supporting Vegetation, Fuels, Botany and Wildlife resource reports will analyze and disclose the effects of all alternatives, including no action, on project-specific forest and fire ecology. Information from available relevant literature will be considered. Planting is part of the proposed treatment but traditional plantation establishment is not.
Soils			
#6-16	Other Issue C	Total organic matter remaining after the fire and after salvage is the key indicator for the issue of site productivity. Please address soil chemistry, productivity, hydrology, and biological integrity on a site-specific (i.e., unit-by-unit) basis. Please map soil types and composites using field reconnaissance data and include the maps in the NEPA document. Include a qualified, journey-level soil scientist on the ID Team. Design actions and mitigation after you have collected field reconnaissance data on soils at every site proposed for action. Please do not lump "moderate" and "severe" fire impacts to soils in your forthcoming analysis.	The environmental assessment and supporting Vegetation, Fuels, Botany, Hydrology and Soils resource reports will analyze and disclose the effects of all alternatives, including no action, on project-specific soil, hydrology and vegetation factors. Information from available relevant literature will be considered. Soil mapping is part of the process of determining effects on soils. A qualified, journey-level soil scientist is part of the interdisciplinary team and prepared the soils information for the documents. The Burned Area Emergency Rehabilitation team provided a map that separates out "moderate" and "severe" effects to soils for the project area; field visits by the soil scientist to a representative sample of soil types were used to influence the design of prescriptions and project design features to minimize potential negative effects.
#6-17	Other Issue C	Please note that the KNF FY12 Monitoring and Evaluation Report (page 8 and 9) discusses impacts of post-fire tractor yarding in the Panther Salvage timber and states: The majority of areas that did not meet desired	The environmental assessment and supporting Soils resource report will analyze and disclose the effects of all alternatives, including no

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		[post project] conditions were located on primary skid trails and landings. Due to a lack of protective duff mat on the soil surface, and increased amount of disturbance was noted on secondary skid trails compared to green timber sales. Recommended changes to planning tractor yarding for salvage timbers sales is to reduce the extent of soil displacement and compaction by limiting slope steepness where skidding can occur or limiting the total area in the unit in primary and secondary skid trails. Alternatively, planners can reduce soil disturbance in fire salvage units by changing logging systems from tractor yarding to cable or helicopter yarding. Please avoid logging and yarding activities that likely to result in significant impacts to soil resources.	action, on project-specific soil disturbance. The project-specific conditions in the project area differ substantially from those in the Panther area. Ground-based equipment use will not create the same impacts to soil in the project area because of low slopes and different soil types.
#6-18	Other Issue C	<p>As established in the peer-reviewed literature submitted with these scoping comments, ground-based yarding on post-fire soils is a particularly destructive and controversial practice that necessitates the completion of an EIS. Please address the following conclusions from page 44 of the Doubleday Fire Salvage Environmental Assessment. March 2009. BLM-OR-MO50-0015-EA. Butte Falls Resource Area. Medford District BLM:http://www.blm.gov/or/districts/medford/plans/files/DoubledayFireSalvage.pdf</p> <p>Tractor yarding causes soil compaction and displacement. Soil compaction is an increase in bulk density with a corresponding decrease in soil porosity. Compaction reduces soil productivity through a reduction in root growth, tree height, and timber volume (Graecen and Sands 1980; Froehlich and McNabb 1984) and may be produced by a single pass of logging equipment across a site (Wronski 1984). Productivity losses have been documented for whole sites (West and Thomas 1981) and for individual trees (Froehlich 1979, Helms and Hipkin 1986). Decreases in important microbial populations have also been observed in compacted soils (Amaranthus et al. 1996.) Soil compaction may also increase surface runoff because of reducing infiltration (Graecen and Sands 1980.) Soil displacement from tractor yarding occurs when the tracked equipment turns on its skids pushing the soil into small piles, or berms, along the skid trails. This displacement of the topsoil removes the organic litter layer and exposes mineral soil. Removal of the loose, organic surface materials promotes surface sealing and crusting that decreases infiltration capacity and may increase erosion (Child et. Al. 1989.)⁹ Soil displacement also results in a loss of important soil biota, such as mycorrhizal fungi, which facilitates nutrient uptake by plants (Amaranthus et al. 1989 and 1996.)¹⁰</p>	The environmental assessment and supporting Soils resource report will analyze and disclose the effects of all alternatives, including no action, on project-specific soil disturbance. Project design features will minimize potential negative effects. The results of the environmental assessment will be used to evaluate the need for an EIS. Information from available relevant literature will be considered.
#6-25	Other Issue C	Please do not "lump" moderate and severe fire intensity in your analysis. The NEPA documents should clearly describe the differences in salvage logging impacts on forests that have experienced fire of different severity.	The Burned Area Emergency Rehabilitation team provided a map that separates out "moderate" and "severe" effects to soils for the

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		For instance, soils that are severely burned are likely to respond to ground-based yarding much differently than soils that are moderately burned.	project area; the soil scientist will consider these separately in the Soil resource report and project design features to minimize potential negative effects.
Water Resources			
#6-50	Other Issue C	Besechta et al. (1995) warned that even temporary road construction should be prohibited on burned landscapes. Existing roads in the watershed are experiencing significant slumping and failure that contributes directly to sediment loading. Commercial landings, log decks, and hauling have similar direct impacts on soil and hydrological values.	The environmental assessment and supporting Soils and Hydrology resource reports will analyze and disclose the effects of all alternatives, including no action, on project-specific soil disturbance from temporary roads on existing roadbeds and landings and potential sediment loading. Project design features will minimize potential negative effects. Information from available relevant literature will be considered.
#6-52	Other Issue C	The construction of landings also causes erosion at elevated levels and contributes sediment over considerable distances. (Detcheson and Megehan 1996) The increased sedimentation should be considered in light of all past, present and foreseeable future activities in the watershed.	The environmental assessment and supporting Soils and Hydrology resource reports will analyze and disclose the effects of all alternatives, including no action, on project-specific soil disturbance from temporary roads on existing roadbeds and landings and potential sediment loading. Project design features will minimize potential negative effects. Information from available relevant literature will be considered.
National Environmental Policy A			
#2-2 #3-1	Other Issue B	In order for this project to be successful, timing is essential. NEPA needs to be as simple as possible. It appears there are no key wildlife or water issues. Only analyze real issues. Do not make up or use issues that are not significant.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. The environmental assessment will address effects of alternatives in meeting requirements of law, policy, regulations and the Forest Plan.
#4-1	Other Issue B	In order for this project to be successful timing is essential. NEPA needs to be as simple as possible. It appears there are no key wildlife or water issues.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
			marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. The environmental assessment will address effects of alternatives in meeting requirements of law, policy, regulations and the Forest Plan.
#6-1	Other Issue B	We hope that these comments from the Klamath Siskiyou Wildlands Center (KS Wild) on behalf of ourselves, the Environmental Protection Information Center (EPIC) and the Klamath Forest Alliance (KFA) will be incorporated into project planning and design.	Comments will be incorporated into alternatives and the analysis of the environment effects.
#6-26	Other Issue B and C	Please disclose and analyze the cumulative impacts of the proposed fire salvage in conjunction with prior and foreseeable management activities in the watershed. Clearly address the cumulative impacts on future fire behavior, snag retention, soil health, hydrology and wildlife.	Cumulative effects of past, ongoing and reasonable foreseeable future actions, added to the effects of each alternative on each resource, will be considered in the environmental assessment and supporting resource reports.
#6-27	Other Issue B	We believe that the significant cumulative impacts on these watersheds from past road construction and federal logging, combined with the impacts of fire suppression and proposed post-fire logging across all Forest Service land use allocations may require the completion of an EIS for this proposed timber sale.	Cumulative effects of past, ongoing and reasonable foreseeable future actions, added to the effects of each alternative on each resource, will be considered in the environmental assessment and supporting resource reports. The results of the environmental assessment will be used to evaluate the need for an EIS.
#6-28	Other Issue B and C	Please note that a proper consideration of the cumulative impacts of a project requires "some quantified or detailed information;...[g]eneral statements about some possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." <i>Neighbors of Cuddy Mountain v. United States Forest Serv.</i> , 137 F.3d 1372, 1379-80 (9th Cir. 1998)). The analysis "must be more than perfunctory; it must provide a useful analysis of the cumulative impacts of past, present and future projects." <i>Id.</i>	Cumulative effects of past, ongoing and reasonable foreseeable future actions, added to the effects of each alternative on each resource, will be considered in the environmental assessment and supporting resource reports. Effects will be quantified where possible.
#6-29	Other Issue B and C	The many severe cumulative impacts from timber sale activities, road construction and fire suppression in this planning area must be analyzed in a NEPA document such that: A proper consideration of the cumulative impacts of a project requires "some quantified or detailed information;...general statements about possible effects and some risk do not constitute a hard look absent a justifications regarding why more definitive information could not be provided." <i>Ocean Advocates</i> , 361 F.3d at 1128 (quoting <i>Neighbors of Cuddy Mountain v. US Forest Service</i> , 137	Cumulative effects of past, ongoing and reasonable foreseeable future actions, added to the effects of each alternative on each resource, will be considered in the environmental assessment and supporting resource reports. Effects will be quantified where possible.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		F.3d 1372, 1379-80 (9th Cir. 1998)). The analysis "must be more than perfunctory; it must provide a useful analysis of the cumulative impacts of past, present, and future projects." <i>Id.</i> -KS Wild v. BLM 387 F 3d. 15269 (9th Cir. 2004).	
#6-30	Other Issue B and C	As discussed in the Ninth Circuit's ruling of July 24, 2007 NEPA requires disclose of the cumulative impacts of multiple actions: One of the specific requirements under NEPA is that an agency must consider the effects of the proposed action in the context of all relevant circumstances, such that where "several actions have a cumulative...environmental effect, this consequence must be considered in an EIS." <i>Neighbors of Cutty Mountain v. US Forest Service.</i> , 137 F3d 1372, 1378 (9th Cir. 1998) quoting <i>City of Tenakee Springs v. Clough</i> , 915 F.2d 1308, 1312 (9th Cir. 1990)). A cumulative effect is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or persons undertakes such other actions." 40 CFR § 1508.7. Our cases firmly establish that a cumulative effects analysis "must be more than perfunctory; it must provide a useful analysis of the cumulative impacts of past, present, and future projects." <i>Klamath Siskiyou Wildlands Center v. BLM</i> , 387, F.3d 989, 993 (9th Cir. 2004). To this end, we have recently noted two critical features of a cumulative effects analysis. First, it must not only describe related projects but also enumerate the environmental effects of those projects. See <i>Lands Council v. Powell</i> , 395 F.3d 1019, 1028 (9th Cir. 2005) (holding a cumulative effects analysis violated NEPA because it failed to provide adequate data of the time, place, and scale" and did not explain in detail "how different project plans and harvest methods affects the environment"). Second, it must consider the interaction of multiple activities and cannot focus exclusively on the environmental impacts of an individual project. See <i>Klamath Siskiyou Wildlands Center</i> , 387 F 3d at 996 (finding a cumulative effects analysis inadequate when "it only considers the effects of the very project at issue" and does not "take into account the combined effects that can be expected as a result of undertaking" multiple projects). -Oregon Natural Resources Council et al. v. Brong. 9th Circuit. July 24, 2007.	Cumulative effects of past, ongoing and reasonable foreseeable future actions, added to the effects of each alternative on each resource, will be considered in the environmental assessment and supporting resource reports.
#6-5	Other Issue B	Please note that the scoping notice for this project does not contain enough information for our organizations or the public to provide fully informed comments on the substance of this Forest Service proposal or its environmental consequences. We are concerned about the direct, indirect, and cumulative environmental impacts on wildlife, watersheds and other resources in the area and we request an additional commenting period after the agency presents a detailed analysis of the project's effect and	The environmental assessment and supporting resource reports will be available for public comment before a decision is made per 36 CFR 218.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		prior to finalizing the Environmental Assessment or Environmental Impact Statement.	
#6-6	Other Issue B	SCIENCE INDICATES THAT SALVAGE LOGGING INVOLVES SIGNIFICANT ENVIRONMENTAL IMPACTS SUCH THAT AN EIS MUST BE PREPARED	The results of the environmental assessment will be used to evaluate the need for an EIS. Scientific information from available relevant literature will be considered.
Multiple Resources			
#2-9 #3-8 #4-7	Other Issue C	Quick response is also very important for removing the remaining dead material. There appears to be very little in the way resource issues with this part of the restoration as well. There is no owl, goshawk, fish, or water issues. Archeology could be done fairly quickly. Much of that should have been looked at during the suppression activities.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. Information from the fire and the BAER team will be used.
#6-31	Other Issue C	Given the impacts of past Forest Service logging and road activities on the hydrological and terrestrial health of the project area, it is vital that the agency analyze and disclose the cumulative impacts of past activities and its future plans. The Little Deer fire drew a heavy suppression response that included tree felling, road use, burnout and use of chemical retardants over broad areas. Backer and others (2004) described numerous potentially significant adverse effects on the environment resulting from the suppression of fire including: - Direct soil damage resulting from emergency road, fire line, and helispot construction. - Hydrological impacts caused by fire lines, which route overland water flow and disrupt soil infiltration. - Chemical pollution of water and soil from aerial flame retardant drops. - Destruction of snags and other ecologically significant large woody debris. - Spread of highly flammable exotic plants.	Cumulative effects of past, ongoing and reasonable foreseeable future actions, added to the effects of each alternative on each resource, will be considered in the environmental assessment and supporting resource reports.
#6-32	Other Issue C	The public and the decision maker must be able to discern whether these factors resulted in significant impacts when considered cumulatively with the proposed action. Consideration and disclosure of cumulative impacts should include, but not be limited to, the following issues: 1. All past "shelterwood" cuts and clear-cuts, including their impacts on overall canopy cover, old growth quality and extent, and habitat suitability for canopy dependent species including sensitive and indicator species. 2. All past crown fires, including their impacts on overall canopy cover, old growth quality, quantity and extent, and habitat suitability for canopy dependent species including sensitive and indicator species. 3. Past changes in forest structure, including those resulting from the fire, and their impacts on wildlife habitat and populations. 4. Invasive plant populations	Cumulative effects of past, ongoing and reasonable foreseeable future actions, added to the effects of each alternative on each resource, will be considered in the environmental assessment and supporting resource reports.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		occurring in past timber sales, along roads and in past fire perimeters, and the potential for the proposed action and/or spatially or temporally concurrent management to introduce and increase invasive plant populations within the project area. This analysis should also evaluate invasive plant population responses to climate, seasonality, soil, slope, aspect, land uses, management activities, timing and interactions therein. 5. Overall fire management goals for the planning area, especially the Forest Service's ability to employ Wildland Fire Use as a management tool. The Forest Service should specifically frame the proposed action in terms of fire management goals, and it should demonstrate in the context of cumulative effects analysis-using maps, GIS and a Fire Management Plan-how the proposed restoration activities serve as a corrective step that facilitate managing natural fires both within and beyond the project area in the future. 6. Location of the project area and proposed management activities, including roads and skid trails, in relationship to the location of important wildlife habitat, both formally protected habitats and other important habitat, such as wildlife movement corridors.	
Position or No Rationale Provided			
#1-2	Other Concern	The proposed treatments are obviously well thought out to meet the guidelines established in all the public policies that the Service must adhere to. Project Design Features clearly address objectives and specify guidelines that minimize impacts to resources and enhance or restore desired conditions.	We appreciate your support.
#1-4	Other Concern	In short I support the purpose and need of this Project and the actions proposed to meet these needs	We appreciate your support.
#2-1	Other Concern	Many of our members have their operations in communities within and adjacent to the Klamath National Forest and management on these lands ultimately dictates not only the viability of their businesses, but also the economic health of the communities themselves.	Economic health of communities is considered in the environment assessment of effects of alternatives and in the supporting Social and Economic resource report.
#5-1	Other Concern	I am submitting these comments in strong support of the Little Deer Project.	We appreciate your support.
#5-3	Other Concern	Thank you for the speed with which this project is moving forward.	We appreciate your support.

The comments received during the two field trips to the Little Deer project area that were led by the Forest Service are summarized below. The first field trip was held on September 12, 2014 and included Richard Svlich of the American Forest Resource Council, Tristan Allen of CLT Logging and two Forest representatives. Representatives from Klamath-Siskiyou Wildlands Center including George Sexton and Jordan Beckett joined Laura Allen (Goosenest District Ranger), and two additional Forest representatives for a second field trip planned for September 11, 2014, but rescheduled and held on October 8, 2014.

Table D- 4: Field trip dates and respondents attended

Field Trip	Date Received	Name of Respondent/Affiliation
1	September 12, 2014	Richard Svilich of American Forest Resource Council, and Tristan Allen of CLT Logging
2	October 8, 2014	George Sexton and Jordan Beckett of Klamath Siskiyou Wildlands

Table D- 5: Disposition of field trip issues raised

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
#1-1	Other Issue C	During the review it was obvious the Forest has opportunities to not only capture biomass but also remove merchantable sawlogs from the burned area. The one key component is that time is of the essence. You are already a month behind in beginning to accomplish vegetative restoration activities within the Little Deer fire area. A two tiered approach should be taken to quickly getting burned wood removed and the area restored with new conifer seedlings. The first involves quickly removing the hazard trees along the public access road systems and the second involves doing a quick environmental assessment to remove much of the remaining dead material.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. The Forest and District have put a priority on completing this analysis and disclosure in a timely manner.
#1-2	Other Issue C	The roadside hazard should be done only along those roads deemed open for public access. There are only a few miles within this category (2-4 depending upon your interpretation). These road systems do have a considerable amount of merchantable trees and smaller biomass material.	The purpose of hazard tree removal is to ensure safety for forest workers and the public. Therefore, these treatments are proposed near landings as well as along Forest System roads; most of these roads are open for public access. Harvest and removal of these trees can also help meet other parts of the purpose and need for the project.
#1-3	Other Issue C	All the road systems can be ground based harvested very easily. Don't forget the hazard trees along Hwy 97 that are not within the state right-of-way.	Hazard trees along Highway 97 and outside the State right-of-way are proposed for removal in the proposed action.
#1-4	Other Issue C	There does not appear to be any resource issues or constraints along any of the road systems. Most of the material is completely dead. There should be no threatened or endangered species issues as there is no habitat. There are no water related issues.	Effects on resources will be analyzed and disclosed in the environmental assessment and relevant resource reports. These will include effects on federally-listed threatened, endangered or proposed species and on water.
#1-5	Other Issue C	The only objective for this operation should be for public safety. It is obvious the trees need to be removed for public safety	The purpose of hazard tree removal is to ensure safety for forest workers and the public.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
		reasons.	
#1-6	Other Issue C	The entire project could easily be done by Designation by Description and sale preparation would be minimal with just a handful of leave trees needing to be designated.	Prescriptions for each area and treatment within the project will be specified in the description of each action alternative. Leave trees will be marked to meet project objectives.
#1-7	Other Issue C	It is imperative the hazard tree portion be scoped ASAP. As we stated at the salvage meeting, all of the fire areas should be scoped quickly to reduce the timelines you are required to follow.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. The Forest and District have put a priority on completing this analysis and disclosure in a timely manner.
#1-8	Other Issue C	Since this work is being done for public safety and there are no real issues we see no reason why a quick Categorical Exclusion (CE) could not be accomplished to complete this necessary work. In fact the project is basically benign and we believe a CE could be finished by the middle to end of November. Advertisement and award could be done immediately after the CE is signed and the material could be removed during the upcoming winter.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. The Forest and District have put a priority on completing this analysis and disclosure in a timely manner.
#1-9	Other Issue C	Quick response is also very important for removing the remaining dead material. There appears to be very little in the way resource issues with this part of the restoration as well. There are no owl, fish, or water issues. Archeology could be done fairly quickly. Much of that should have been looked at during the suppression activities. If the Forest is serious about capturing merchantable volume off of this burn, a simple non-complex EA could easily be accomplished by the end of the calendar year. Once again, project scoping needs to occur ASAP. The following highlights some of the observations made during the field trip.	The purpose and need for the project includes the need to "obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable." The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. Information from the fire and the BAER team will be used.
#1-10	Other Issue C	There are many areas that will not be proposed to be harvested, rock piles, partially burned areas, steep terrain, etc. You need to identify those acres that will not be harvested to show that hundreds, if not thousands, of dead trees will remain within the project area.	Acres that will and will not be proposed for harvest in action alternatives will be displayed on the maps that are part of the environmental assessment.
#1-11	Other Issue C	Highlight the percentage of acreage treated vs. not treated.	Acres that will and will not be proposed for harvest in action alternatives will be displayed on the maps that are part of the environmental assessment.
#1-12	Other	It is essential that NEPA be done early enough to allow harvesting	The purpose and need for the project includes the need

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
	Issue C	to be accomplished this upcoming winter in order to capture merchantable wood from the larger trees.	to “obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable.” The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects.
#1-13	Other Issue C	Leave the minimum required for snag retention within the treated areas. These trees will not be standing for more than 5-7 years after the fire anyhow.	Snag retention guidelines and prescriptions for each area and treatment within the project will be specified in the description of each action alternative. Likelihood of snags of various vegetation types persisting will be discussed.
#1-14	Other Issue C	Do not identify any type of diameter limit for leave trees. There are more trees, greater than 18 inches, within the project area than what is required for snag retention guidelines.	Snag retention guidelines for each area within the project will be specified in the description of each action alternative. Leave trees will be marked to meet project objectives.
#1-15	Other Issue C	You would be best to leave your snag retention trees in groups. Leaving several dead trees in groups allows for more intensive treatment for several acres around the groups. Trees left in the non-treated areas can also be counted towards meeting your snag retention guidelines.	Snag retention guidelines for each area within the project will be specified in the description of each action alternative. Leave trees will be identified in clumps to meet Forest Plan standards and marked to meet project objectives.
#1-16	Other Issue C	Sale preparation could be accomplished very easily. Target the areas with complete dead for your treatment. That was a majority of the burn area anyhow. Flag those areas left as sang retention areas and mark green trees to be left (there are very few of those). The remainder could then be designated by description.	Snag retention guidelines and prescriptions for each area and treatment within the project will be specified in the description of each action alternative. Leave trees will be marked to meet project objectives.
#1-17	Other Issue C	We are hopeful the District/Forest will place a priority in getting this material removed as quickly as possible. Due to the lack of resource concerns we see no reason why NEPA can’t be completed quickly and be done in a timeframe to allow for harvesting this winter. But as stated previously, time is of the essence. Also, by getting this non-complex fire area out of the way you then will be able to focus your attention to those fires that are more complex.	The purpose and need for the project includes the need to “obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable.” The timeline for planning has been developed to meet this need while following requirements of environmental analysis of effects. The Forest and District have put a priority on completing this analysis and disclosure in a timely manner.
#1-18	Other Issue C	The key objective for this project is the rapid vegetative restoration of the burned area and the ability to capture wood products (including sawtimber) in a timely manner. We believe the majority of the taxpayers and county residents would rather see a quick response to the restoration efforts on this fire by producing an economically feasible project that will produce some revenue. That is far better than dragging your feet and then having to spend taxpayer’s dollars to accomplish the same outcome.	The purpose and need for the project includes the need to “obtain maximum economic commodity and value from burned timber by offering a sale while the wood is still marketable.” The timeline for planning has been developed to meet this need and other parts of the purpose and need while following requirements of environmental analysis of effects. The Forest and District have put a priority on completing this analysis and disclosure in a timely manner.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
#1-19	Other Issue C	We are more than happy to assist in making this restoration effort a successful venture. Feel free to call on any of the industry members with questions concerning logging feasibility, merchantability specs, biomass opportunities, markets, etc.	We appreciate the offer of assistance by the industry.
#2-1	Other Issue C	KS Wild has concerns about treatments in riparian reserves. They pointed out PDF HYDR-7 and HYDR-8.	Alternative 3 will be developed to address this issue by excluding treatments in riparian reserves. HYDR-7 and HYDR-8 will be clarified in the draft environmental assessment.
#2-2	Other Issue C	Oversnow or frozen ground logging restrictions are not realistic to have as a provision in timber sale (USFS). KS Wild understands this and proposes this be a PDF, but does not expect it to be an actual timber sale contract provision.	Based on recent past experience, weather may limit the possibility of logging over snow or frozen ground.
#2-3	Other Issue C	We will use this project to close unauthorized travel routes. (USFS)	The purpose and need of this project does not include the decommissioning of system roads; however temporary roads on existing road beds (prisms) are proposed to effectively treat the area and avoid long skids; these temporary roads will be closed (decommissioned) after they are no longer needed to implement the project. The soils and hydrology sections of the environmental assessment and the relevant resource reports disclose the effects of temporary roads.
#2-4	Other Issue C	KS Wild appreciates that we are not proposing any new roads as part of this project.	We appreciate your support.
#2-5	Other Issue C	KS Wild would like to see 30% of the project area to remain untreated. George suggested tracking this 30% in 40 acre pieces. James replied that the KNF forest management plan states 100 acre pieces to track snag numbers, so we will probably use the 100 acre figure for snag retention numbers.	Alternative 3 will be developed to address this issue by sectioning treatment stands into 40-acre blocks with the grid starting at the center of the project area. Snag retention guidelines and prescriptions for each area and treatment within the project will be specified in the description of each action alternative. The environmental assessment and supporting Vegetation and Biology resource reports will analyze and disclose the effects of all alternatives, including no action, on snag-associated management indicator species. The analysis will consider snags per acre on each stand or unit as well as overall for the project area. Information from available relevant literature will be considered.
#2-6	Other Issue C	KS Wild would like to see timber sale skid trails shown in NEPA documents. At the least, they would like to see a soil scientist help the sale administrator's layout these skid trails. KS Wild thought the skid trail usage on Mt. Hebron had been acceptable.	The environmental assessment and supporting Soils resource report will analyze and disclose the effects of all alternatives, including no action, on project-specific soil disturbance. The project-specific conditions in the project area differ substantially from those in the Panther area.

Letter-Comment Number	Issue or Concern	Scoping Comments	Disposition of Scoping Comments
			Ground-based equipment use will not create the same impacts to soil in the project area because of low slopes and different soil types.
#2-7	Other Issue C	KS Wild suggests stands that were unmanaged in the past, or exhibit complex, legacy conditions to remain untreated. On the same point, focus treatments in areas that have had treatments in the past, such as plantation areas.	Alternative 3 will be developed to focus treatments.
#2-8	Other Issue C	Treatment in riparian reserves will be limited (USFS). KS Wild is not concerned about those riparian reserves that are stock ponds. KS Wild pointed out that the Salmon Salvage excluded treatments in riparian reserves.	Alternative 3 will be developed to address this issue by excluding treatments in riparian reserves.
#2-9	Other Issue B	Under an EA we can have no significant impacts (USFS).	In the environmental assessment and supporting resource reports cumulative effects of past, ongoing and reasonable foreseeable future actions, added to the effects of each alternative on each resource, will be used to develop the FONSI.
#2-10	Other Issue C	Hazard trees will only apply along MVUM system roads (USFS).	The purpose of hazard tree removal is to ensure safety for forest workers and the public. Therefore, these treatments are proposed only along Forest System roads.

Appendix E: Best Management Practices

Best Management Practices (BMPs) have been certified by the State Water Quality Resources Control Board and approved by the Environmental Protection Agency (EPA) as a way of protecting water quality from impacts stemming from non-point sources of pollution. These practices have been applied to forest activities and have been found to be effective in protecting water quality within the Klamath National Forest. Specifically, effective application of the R-5 USDA Forest Service BMPs has been found to maintain water quality that is in conformance with the Water Quality Objectives in the North Coast Region Water Quality Control Board's Basin Plan.

The following list of BMPs will be implemented in the Little Deer Project. A description of the objective of each BMP is included, as well as how each practice will be specifically implemented within the project. These are the "on-the-ground" prescriptions that are required by the Waiver. For additional information on the BMPs and their objectives, see Water Quality Management for Forest System Lands in California (USDA 2000) and R-5 Water Quality Management Handbook (USDA 2011).

BMP 1.3 - Determining Surface Erosion Hazard for Timber Harvest Unit Design - To identify high-erosion hazard areas to adjust treatment measures and prevent downstream water-quality degradation.

- The soil erosion hazard rating is analyzed in the Soil Resources report.

BMP 1.4 - Using Sale Area Maps and/or Project Maps for Designating Water-Quality Protection Needs - To ensure recognition and protection of areas related to water-quality protection delineated on a sale-area map or a project map.

- HYDR-3: Protected equipment exclusion areas and drafting sites will be on the Sale Area Map Temporary roads, riparian reserves, and landing locations will be displayed on Green Cards.

BMP 1.5 - Limiting the Operating Period of Timber Sale Activities - To ensure that the purchasers conduct their operations, including, erosion-control work, road maintenance, and so forth, in a timely manner, within the time specified in the timber sale contract.

- SOIL-8: The Klamath Wet Weather Operation Standards (WWOS) (USDA Forest Service 2002) will be used for all project activities.
- SOIL-9: The project is proposed to take place during the normal operating season (NOS) that is defined as May 1 to November 1 and in dry periods outside the NOS with Line Officer approval. Actions will be restricted during periods of wet weather during the NOS.

BMP 1.8 - Streamside Management Zone Designation - To designate a zone along riparian areas, streams, and wetlands that will minimize potential for adverse effects from adjacent management activities. Management activities within these zones are designed to improve riparian values.

- HYDR-1: RRs in the Project Area include intermittent streams and constructed ponds with 150 ft. widths.
- HYDR-8: In order to maintain potential coarse woody debris in the Riparian Reserves, non-hazard fire killed trees greater than 20 inches will not be removed from the Riparian Reserve adjacent to first creek in the Dead Tree Removal units.

BMP 1.9 - Determining Tractor-loggable Ground - To minimize erosion and sedimentation resulting from ground disturbance of tractor logging systems.

- See BMP 5.2.

BMP 1.10 - Tractor Skidding Design -: By designing skidding patterns to best fit the terrain, the volume, velocity, concentration, and direction of runoff water can be controlled in a manner that will minimize erosion and sedimentation.

- SOIL-3: No new full bench skid trails will be created.
- SOIL-7: Reuse existing skid trails and landings whenever practical. Dedicate no more than 15 percent of a unit to primary skid trails and landings by good yarding layout and administration.
- HYDR-9: Intermittent channels may be crossed at locations designated by the Forest Service when dry and stream banks unsaturated during skidding. Crossings will be in locations where the banks are gentle and not undercut.

BMP 1.12 - Log Landing Location - To locate new landings or reuse old landings in such a way as to avoid watershed impacts and associated water-quality degradation.

- HYDR-4: New landings will not be constructed within Riparian Reserves.

BMP 1.13 - Erosion Prevention and Control Measures during Timber Sale Operations - To ensure that the purchasers' operations will be conducted reasonably to minimize soil erosion.

- SOIL-4: If available on site, post-treatment soil cover will range from 60-80 percent depending on slope steepness and soil texture. If post-harvest soil cover is below recommended levels, slash will be left on site to prevent soil erosion.
- SOIL-5: Prevent road runoff from draining onto skid trails and or landings.
- SOIL-10: Tractor skidding will occur on designated skid trails. Tractors may leave skid trails to access isolated logs if ground conditions permit.
- SOIL-11: Waterbar skid trails per Sale Administration Handbook guidelines and as needed. Tree tops may be used instead of waterbars on slopes less than 10 percent.

BMP 1.19 - Streamcourse and Aquatic Protection - To conduct management actions within these areas in a manner that maintains or improves riparian and aquatic values; To provide unobstructed passage of stormflows; To control sediment and other

pollutants entering streamcourses; and To restore the natural course of any stream as soon as practicable, where diversion of the stream has resulted from timber management activities.

- HYDR-6: Spill kits will be on site during equipment fueling and lubrication
- SOIL-6: Retain existing coarse woody debris (CWD) whenever possible providing the amount of logs to meet fuel management objectives.

BMP 1.20 - Erosion-control Structure Maintenance - To ensure that constructed erosion-control structures are stabilized and working.

- HYDR-2: Erosion Control Measures will be maintained for up to 1 year post-installation.

BMP 2.4 - Road Maintenance and Operations - To ensure water-quality protection by providing adequate and appropriate maintenance and by controlling road use and operations.

- SOIL-1: Access to skid trails that intersect Forest Roads will be blocked with available material (either large wood or boulders) post-implementation.

BMP 2.5 - Water Source Development and Utilization - To supply water for road construction, maintenance, dust abatement, fire protection, and other management activities, while protecting and maintaining water quality.

- HYDR-5: Rocking of approaches in drafting sites will be used as required. All boards and plastic will be removed after use. Erosion control will be used at all locations where the possibility of water spill or overflow will result in sediment being moved toward the creek.
- HYDR-7: Pumps used for drafting will incorporate a mesh screened intake, openings not to exceed 3/16th inch. Portable pumps will be placed on an oil-absorbing mat. During water drafting, operations, stream flows will not be reduced by more than 10 percent at any time.

BMP 2.13 - Erosion Control Plan - Effectively limit and mitigate erosion and sedimentation from any ground-disturbing activities, through planning prior to commencement of project activity, and through project management and administration during project implementation.

- An Erosion Control Plan will be developed and incorporated in to the Waiver application and any timber sale contracts as appropriate.

BMP 5.2 - Slope Limitations for Mechanical Equipment Operation - To reduce gully and sheet erosion and associated sediment production by limiting tractor use.

- SOIL-2: Ground-based logging equipment will be restricted to slopes less than 35 percent.

BMP 5.6 - Soil Moisture Limitations for Mechanical Equipment Operations - To prevent compaction, rutting, and gullyng, with resultant sediment production and turbidity.

- See BMP 1.5

References

- USDA Forest Service. 2002. *Klamath National Forest Wet Weather Operating Standards*. Yreka, CA: Klamath National Forest.
- USDA Forest Service. 2011. Forest Service Handbook Southwest Region (Region 5). Chapter 10- Water Quality Management Handbook Pacific Southwest Region, Vallejo, California.
- USDA Forest Service. 2000. Water quality management for National Forest system lands in California – Best Management Practices. Pacific Southwest Region, Vallejo, California.

Appendix F: Aquatic Conservation Strategy

The Forest Plan contains the components, objectives, and standards for consistency of projects with the Aquatic Conservation Strategy. The Record of Decision (ROD) for the Forest Plan (USFS 1995) is the guiding document for Forest projects; it incorporates the Aquatic Conservation Strategy standards from the ROD for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (commonly known as the Northwest Forest Plan) (USDA Forest Service and USDI Bureau of Land Management 1994).

Current Conditions and Range of Variability

A full description of the Current Condition can be found in the Affected Environment Section of the Water Quality report. Little Deer project area experienced a high severity wildfire in the summer of 2014. The nearly 5,500 acres burned in the Upper and Lower First Creek, Penoyar, Horsethief Creek, Grass Lake Northeast and Grass Lake South 7th field watersheds. As a result, there are components of watershed complexity and connectivity such as coarse woody material, cover, and large live trees that are scarce. The sediment delivery to streams is increased to over the threshold of concern which impacts water quality and the ability for the streams to support beneficial uses. Peak flows are increased for the next 10 years due to the loss of vegetation and soil cover. The riparian vegetation is mainly fire-killed. The grasses and shrubs are re-sprouting but the seed source for conifer recruitment is small.

Alternative 1 will allow for natural recovery of historical conditions but will require more than 50 year to do so. This affects the trends of recruitment of coarse woody debris, large conifer trees, native riparian vegetation and connectivity of the watershed in the Riparian Reserves (See Water Quality report – Alternative 1 - Environmental Consequences).

The watershed historically will not have been highly complex. The Riparian Reserves will have had a few large trees per acre, mainly pine, and moderate amount of woody material. The sediment regime will have been low due to the low gradient and rock content of the soils in the area. Any fine material entering the stream will have been flushed to the vernal pool at the end of the channel each spring. The stream flow will have been and still is snow-melt driven with high flows in the spring and a dry channel for the rest of the year. This will have led to undercut, steep banks and a rocky stream bottom. The area is very rocky, with large piles of rock making up more than 10 percent of the area. Much of the area has shallow soils and will not support a conifer forest. Historically, the area was dominated by pine with a mix of brush and grasses in the openings (See the Vegetation report). The rock piles supported mahogany.

Details of the effects analysis can be found in the Water Quality report and Chapter 3 of the EA.

Alternative 2

- 1.) *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

The analysis will consider effects to large wood recruitment to streams and large trees in the Riparian Reserve. On the short term, alternative 2 will not prevent the attainment of this objective at either the project level or the 5th field watershed scale. The project is designed to avoid the removal of any non-hazard fire-killed trees that meet the criteria for coarse woody debris in the Riparian Reserve. There are also patches of snags being left to meet wildlife and scenery requirements that account for about 10 percent of the dead tree removal units. On the long-term, the watershed complexity will be restored by alternative 2. The conifer reforestation efforts will decrease the amount of time it will take to get large trees in the Riparian Reserve compared to natural recovery alone. This will have a measurable effect on the project level, but a negligible effect on the 5th field watershed scale because of the small amount of any given 5th field being affected (about 3.5 percent of Butte Creek and 0.3 percent of Parks Creek-Shasta River).

- 2.) *Maintain and restore spatial and temporal connectivity between watersheds.*

The analysis will consider effects to semi-aquatic and terrestrial species in the project area. On the short-term, the alternative will not prevent the attainment of the objective because of the snag retention in the project design. Alternative 2 will lead to the restoration of watershed connectivity at the project scale. The conifer reforestation will decrease the time needed to re-establish a conifer forest in the Riparian Reserve. The re-establishment of a conifer forest will better facilitate the movement of semi-aquatic and terrestrial species move through the area by providing cover and areas to rest. This will have a measurable effect on the project level, but a negligible effect on the 5th field watershed scale because of the small amount of any given 5th field being affected (about 3.5 percent of Butte Creek and 0.3 percent of Parks Creek-Shasta River).

- 3.) *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

The analysis will consider effects to channel geomorphology. On the short-term, the alternative will not prevent the attainment of the objective because of project design features limiting heavy equipment use in the Riparian Reserves and the retention of non-hazard, fire-killed trees greater than 20 inches diameter at breast height in the Riparian Reserve. Alternative 2 will restore aquatic systems integrity on the long-term at the project scale. Conifer reforestation will reduce the amount of time the bank stability is susceptible to high flows by establishing a conifer forest faster than natural recovery alone. The effect at the 5th field scale is negligible because of the small amount of any given 5th field being affected (about 3.5 percent of Butte Creek and 0.3 percent of Parks Creek-Shasta River).

- 4.) & 5.) *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems; and Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

Changes to water quality and sediment regime will be analyzed using the USLE model. The alternative will not prevent the attainment of this objective on the short or long-term scale on either the project level or the 5th field level. The Little Deer fire elevated the sediment delivery in the watersheds (appendix B of the Water Quality report, table 8). Even when added to the estimated sediment delivery from the dead tree removal and associated activities (landings and temporary roads on existing roadbeds) beneficial uses are continued to be supported at the project scale. The effect at the 5th field scale is negligible because of the small amount of any given 5th field being affected (about 3.5 percent of Butte Creek and 0.3 percent of Parks Creek-Shasta River).

- 6.) & 7.) *Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats, and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected; and Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows.*

The water quantity analysis considers the effect to base flow using a qualitative assessment and peak flow using the Equivalent Roaded Acres model. The alternative will not prevent the attainment of this objective on the short or long-term on either the project level or 5th field level. The Little Deer fire elevated the peak flow (See Water Quality report – Affected Environment). Even when adding the dead tree removal and associated activities (landings and temporary roads on existing roadbeds) the peak flow is increased by less than 14 percent over natural levels. This will remain elevated for about 10 years then will start to decrease. The 14 percent elevation is not likely to overlap temporally with the timeframe when the channel is most susceptible to high flows which is about 15 years from the year of the fire. The effect at the 5th field scale is negligible because of the small amount of any given 5th field being affected (about 3.5 percent of Butte Creek and 0.3 percent of Parks Creek-Shasta River).

- 8.) & 9.) *Maintain and restore the species composition and structural diversity of plant communities in riparian areas; and Maintain and restore habitat to support well-distributed populations of native plant and invertebrate riparian dependent species.*

This analysis will consider the expected effects to riparian vegetation. alternative 2 does not prevent the attainment of this objective on the short-term at either spatial scale analyzed. The trees being removed are fire-killed or have a 70 percent or greater probability of dying as a result of fire damage. On the long-term the alternative has a high likelihood of contributing to vegetation diversity at the project level. The conifer replanting will be in a mosaic pattern and will include ponderosa as well as shrubs and grasses. There are areas of browse planting as well as mahogany being planted in the rocky areas. This is meant to mimic the historical pattern of vegetation on the landscape. Native grasses are being planted to combat the spread of invasive plant species into the fire disturbed landscape. The alternative will contribute to the restoration of biological and structural diversity at the project level. It also attempts to keep native species on the landscape and minimize invasion of non-native species on the long-term. The effect at the 5th field scale is negligible because of the small amount of any given 5th field being affected (about 3.5 percent of Butte Creek and 0.3 percent of Parks Creek-Shasta River).

Alternative 3

- 1.) *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

The analysis will consider effects to large wood recruitment to streams and large trees in the Riparian Reserve. The recruitment of large trees and coarse woody debris in the Riparian Reserve will be stunted because this alternative relies on natural recovery in the Riparian Reserves. It will take longer to recruit a conifer forest due to the lack of seed source left behind by the Little Deer Fire. There will be a large amount of downed wood recruited over the next 5 to 10 years as the dead trees fall. Most of the dead trees do not meet the requirements for coarse woody debris so the drainage will remain deficient in this essential aspect of watershed complexity. Alternative 3 does not actively work to maintain and restore watershed complexity but it does not prevent the attainment of the objective. This will have no effect on the project level or the 5th field watershed scale because no action is being taken in the Riparian Reserve.

- 2.) *Maintain and restore spatial and temporal connectivity between watersheds.*

The analysis will consider effects to semi-aquatic and terrestrial species in the project area. The cover and coarse woody debris needed to provide connectivity within and between watersheds will be slow to recover for alternative 3. The alternative does nothing to actively recover conifer forest in the Riparian Reserves and relies only on natural recovery of trees. Alternative 3 does not actively maintain and restore watershed connectivity, but it does not prevent the attainment of the objective. This will have no effect on the project level or the 5th field watershed scale because no action is being taken in the Riparian Reserve.

- 3.) *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

The analysis will consider effects to channel geomorphology. There will be no heavy equipment in the Riparian Reserves and crossing the creek with heavy equipment is prohibited. There is no impact to channel geomorphology on the short-term. Alternative 3 relies on natural recovery which will lead to a slow recovery of conifer forest in the Riparian Reserve. There will be a sharp increase in downed wood in the Riparian Reserve as the fire killed trees fall to the ground. These trees, however, are not large enough to meet the coarse woody debris requirements set in the Forest Plan. The downed wood will be beneficial to the physical integrity of the stream channel. There will be a gap in time where bank stability from root support will be limited. The tree roots of the fire killed trees will begin to decay about 10-15 years from now. There will not be a well-established conifer forest in the Riparian Reserve for more than 50 years without conifer reforestation efforts. So banks will be susceptible to high flows for about 35 years in alternative 3. This alternative does not actively maintain and restore the physical integrity of aquatic systems, but it does not prevent the attainment of the objective. This will have no effect on the project level or the 5th field watershed scale because no action is being taken in the Riparian Reserve.

- 4.) & 5.) *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems; and Maintain and restore the sediment regime under which aquatic*

ecosystems evolved. Elements of the regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Changes to water quality and sediment regime will be analyzed using the USLE model. The alternative will not prevent the attainment of this objective on the short or long-term scale on either the project level or the 5th field level. The Little Deer fire elevated the sediment delivery in the watersheds (appendix B of the Water Quality report, table 8). Even when added to the estimated sediment delivery from the dead tree removal and associated activities (landings and temporary roads on existing roadbeds) beneficial uses are continued to be supported at the project scale. The effect at the 5th field scale is negligible because of the small amount of any given 5th field being affected (about 3.5 percent of Butte Creek and 0.3 percent of Parks Creek-Shasta River).

- 6.) & 7.) *Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats, and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected; and Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows.*

The water quantity analysis considers the effect to base flow using a qualitative assessment and peak flow using the Equivalent Roaded Acres model. The alternative will not prevent the attainment of this objective on the short or long-term on either the project level or 5th field level. The Little Deer fire elevated the peak flow (See Water Quality report – Affected Environment). Even when adding the dead tree removal and associated activities (landings and temporary roads on existing roadbeds) the peak flow is increased by less than 14 percent over natural levels. This will remain elevated for about 10 years then will start to decrease. The 14 percent elevation is not likely to overlap temporally with the timeframe when the channel is most susceptible to high flows which is about 15 years from the year of the fire. The effect at the 5th field scale is negligible because of the small amount of any given 5th field being affected (about 3.5 percent of Butte Creek and 0.3 percent of Parks Creek-Shasta River).

- 8.) & 9.) *Maintain and restore the species composition and structural diversity of plant communities in riparian areas; and Maintain and restore habitat to support well-distributed populations of native plant and invertebrate riparian dependent species.*

This analysis will consider the expected effects to riparian vegetation. Alternative 3 relies on natural recovery of vegetation in the Riparian Reserve. There were already shrubs and grasses re-sprouting during field visits in October 2014. However, there is limited seed source for conifer regeneration due to the high severity fire effects. There will be a gap in time (about 20 years) where there will be few conifers in the Riparian Reserves and it will take about 50 years for those trees to contribute to canopy cover and nutrient cycling to support invertebrate riparian dependent species. Alternative 3 does not actively maintain and restore the structural diversity and native plant communities in the Riparian Reserve, but it does not prevent the attainment of the objective. This will have no effect on the project level or the 5th field watershed scale because no action is being taken in the Riparian Reserve.